US008417157B2

(12) **United States Patent**
Saito et al.

(10) **Patent No.: US 8,417,157 B2**
(45) **Date of Patent: Apr. 9, 2013**

(54) **DEVELOPER STORAGE CONTAINER HAVING A TURN STOP PART**

(75) Inventors: **Kazuhiro Saito**, Saitama (JP); **Iwao Kuriki**, Saitama (JP)

(73) Assignee: **Fuji Xerox Co., Ltd.**, Tokyo (JP)

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 306 days.

(21) Appl. No.: **12/813,054**

(22) Filed: **Jun. 10, 2010**

(65) **Prior Publication Data**

US 2010/0316414 A1 Dec. 16, 2010

(30) **Foreign Application Priority Data**

Jun. 11, 2009 (JP) 2009-140298

(51) **Int. Cl.**
G03G 15/08 (2006.01)

(52) **U.S. Cl.** **399/258**

(58) **Field of Classification Search** 399/258, 399/260, 262, 110

See application file for complete search history.

(56) **References Cited**

U.S. PATENT DOCUMENTS

6,023,594	A	2/2000	Okiyama et al.	
2005/0196180	A1	9/2005	Harumoto	
2011/0064481	A1 *	3/2011	Ishiguro et al.	399/263

FOREIGN PATENT DOCUMENTS

EP	1681603	A2	7/2006
JP	08-171330	A	7/1996
JP	2000-231252	A	8/2000
JP	2001109349	A *	4/2001
JP	2001-242692	A	9/2001
JP	2001-281948	A	10/2001
JP	2003-295593	A	10/2003
JP	2005-250375	A	9/2005

OTHER PUBLICATIONS

Japanese Office Action dated Jul. 13, 2009 in counterpart Japanese Application No. 2009-140298.
Communication dated Jul. 3, 2012 from the European Patent Office in counterpart European application No. 10165745.0.

* cited by examiner

Primary Examiner — Quana M Grainger
(74) *Attorney, Agent, or Firm* — Sughrue Mion, PLLC

(57) **ABSTRACT**

A developer storage container includes a container main body, an outflow port, an open/closed member and a turn stop part. The outflow port from which a developer flows out is formed in the container main body storing the developer. The open/closed member is supported to the container main body and, moves relative to the container main body based on a rotation of the container main body. The open/closed member opens and closes the outflow port. The turn stop part is formed on a wall face of the container main body, and has a circular arc shape being concentric with a rotation direction of the container main body. The turn stop part engages with a convex part which is provided in the attachment section and is formed at a different position in response to the image forming apparatus body.

20 Claims, 17 Drawing Sheets

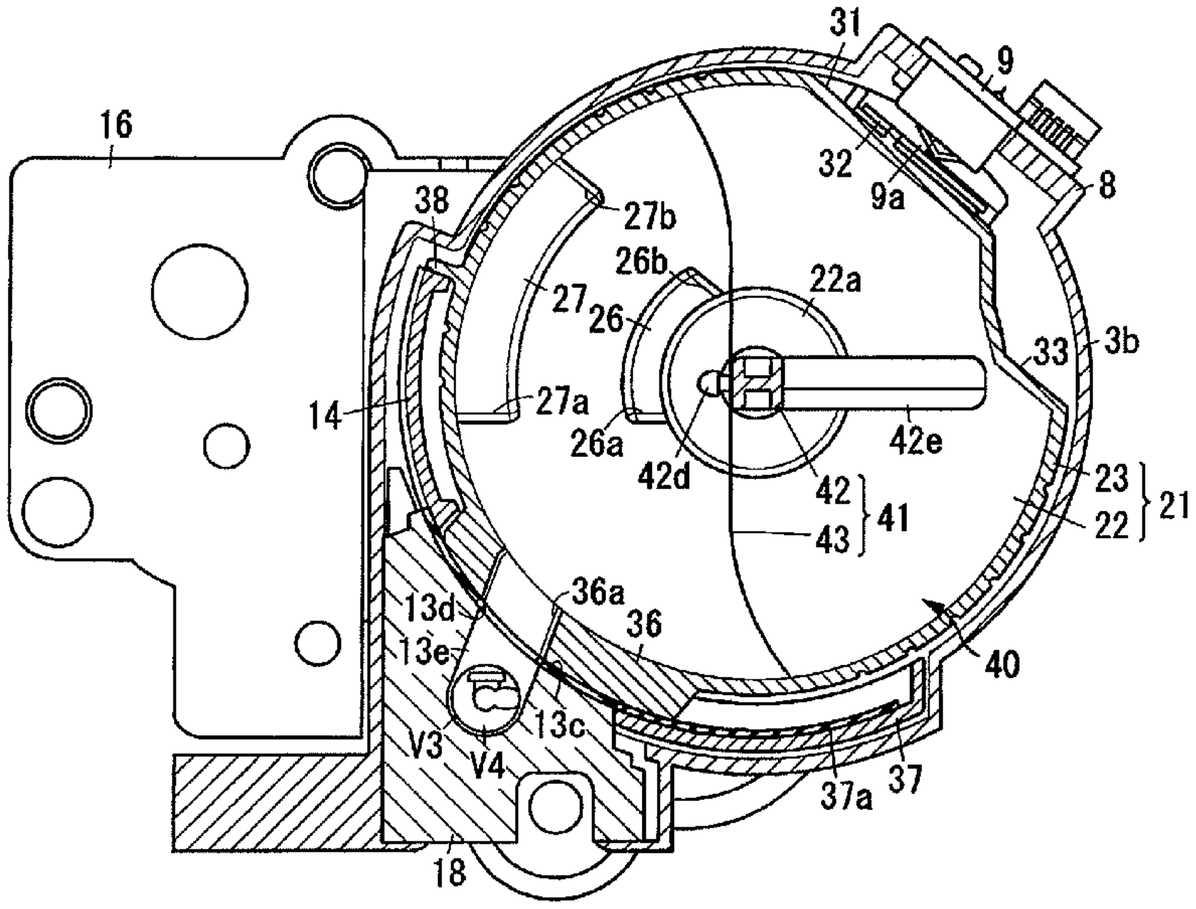


FIG. 1

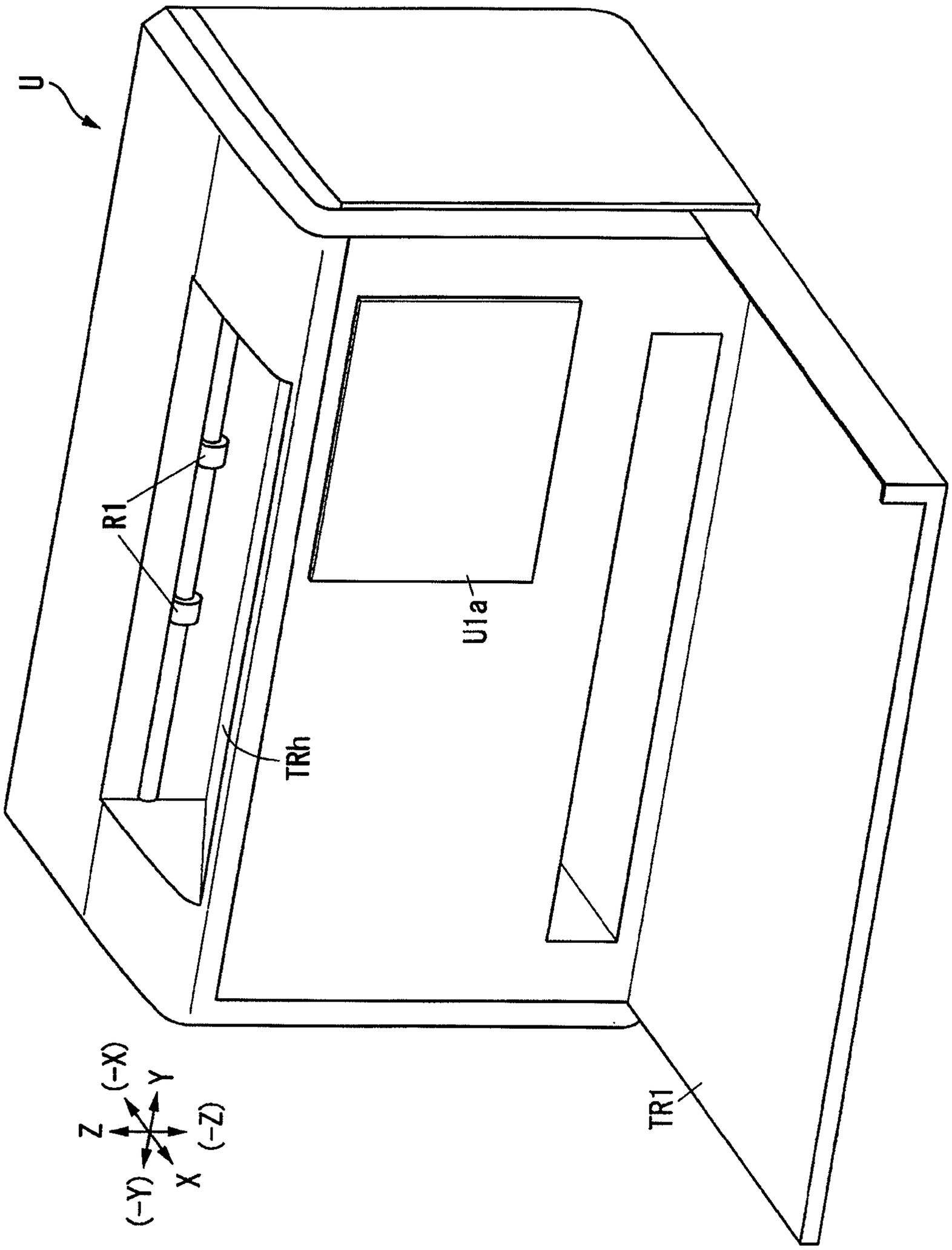


FIG. 2

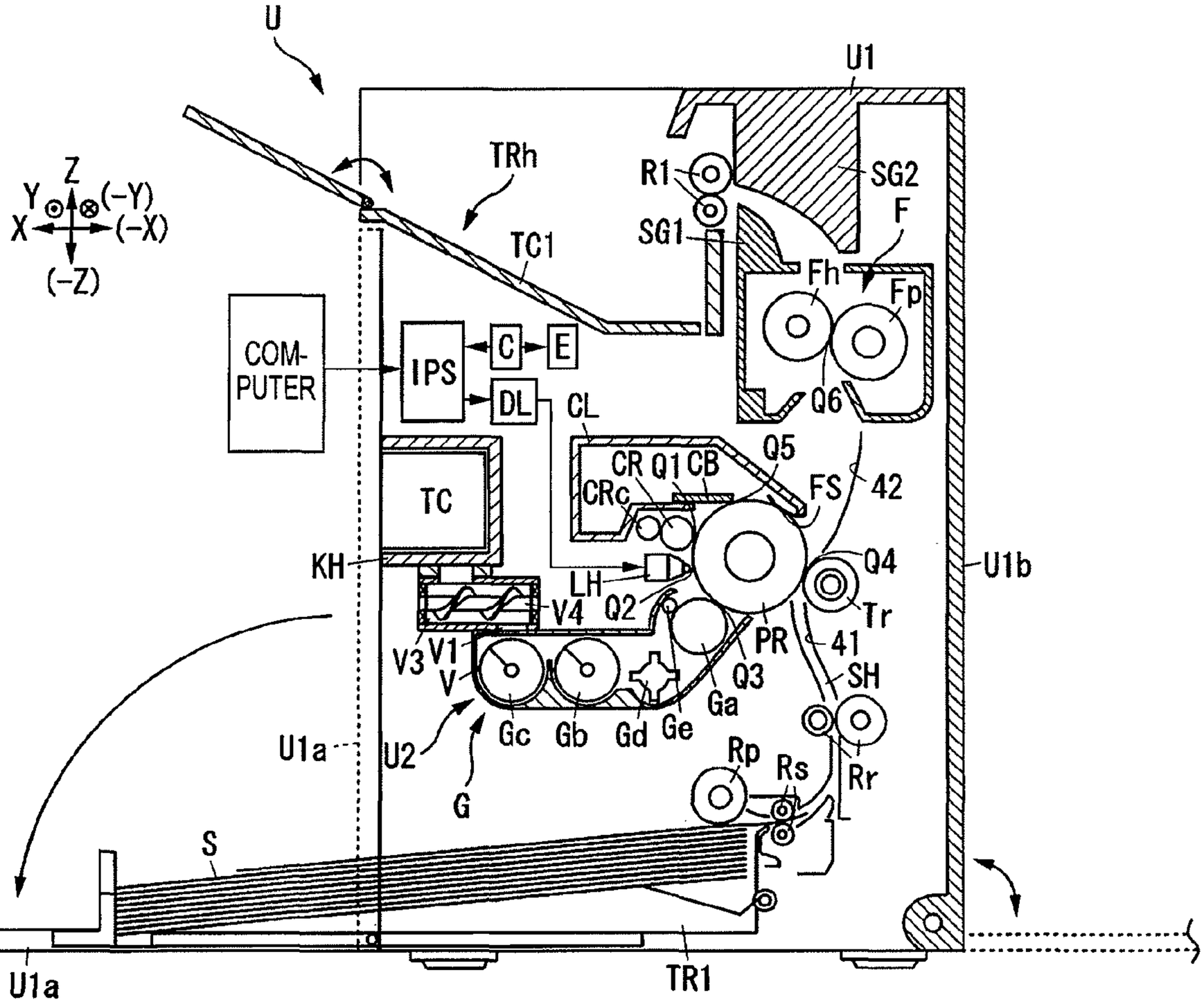

U
U1
TRh
R1
SG2
F
SG1
TC1
Fh
Fp
Z
Y
(-Y)
X
(-X)
(-Z)
COM-
PUTER
IPS
C
E
DL
CL
Q6
Q5
CR
Q1
CB
CRc
FS
42
TC
KH
LH
Q4
U1b
V4
Q2
Tr
PR
41
V3
V1
V
Q3
SH
Ga
U1a
U2
Gc
Gb
Gd
Ge
Rp
Rs
Rr
G
S
U1a
TR1

FIG. 3

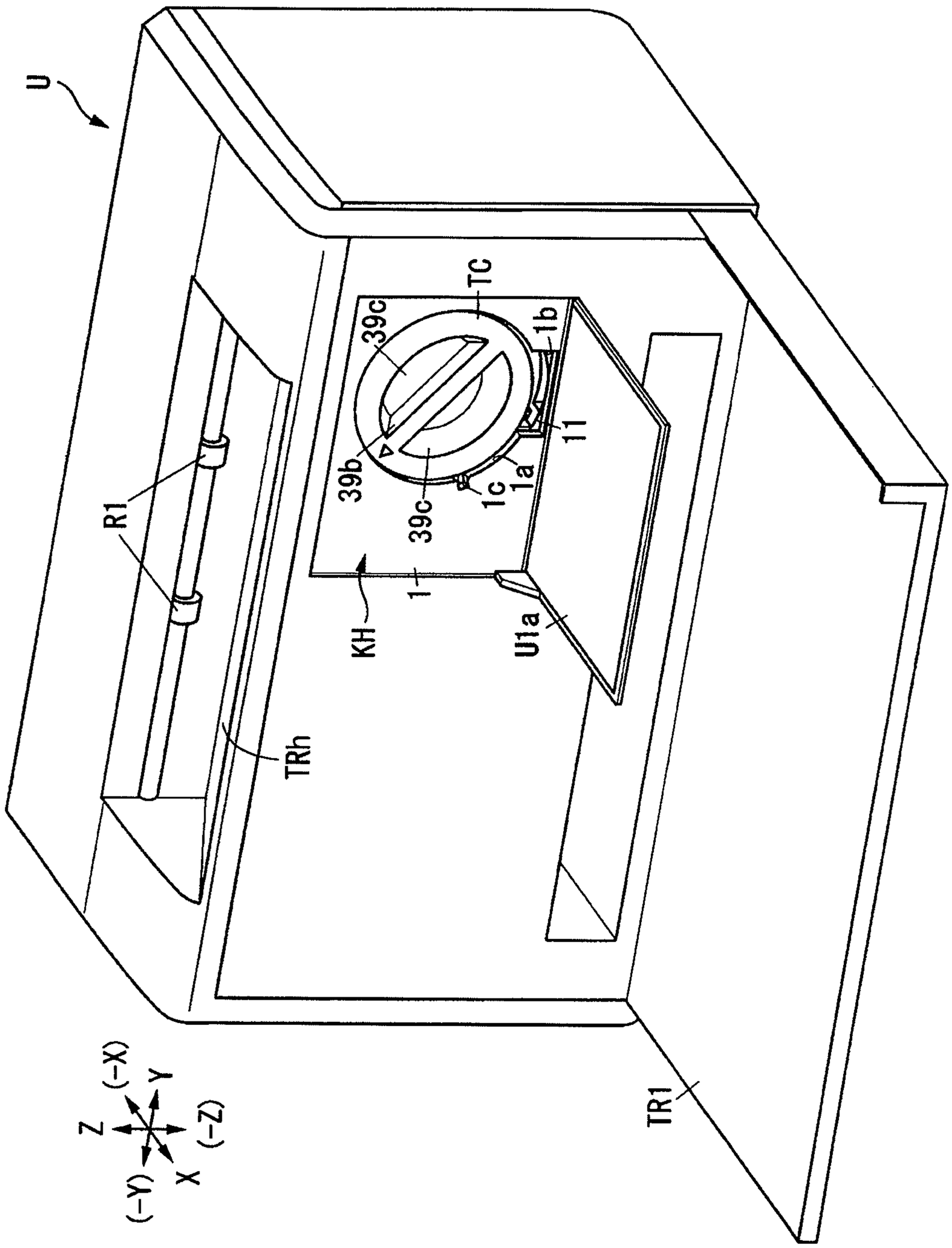


FIG. 4

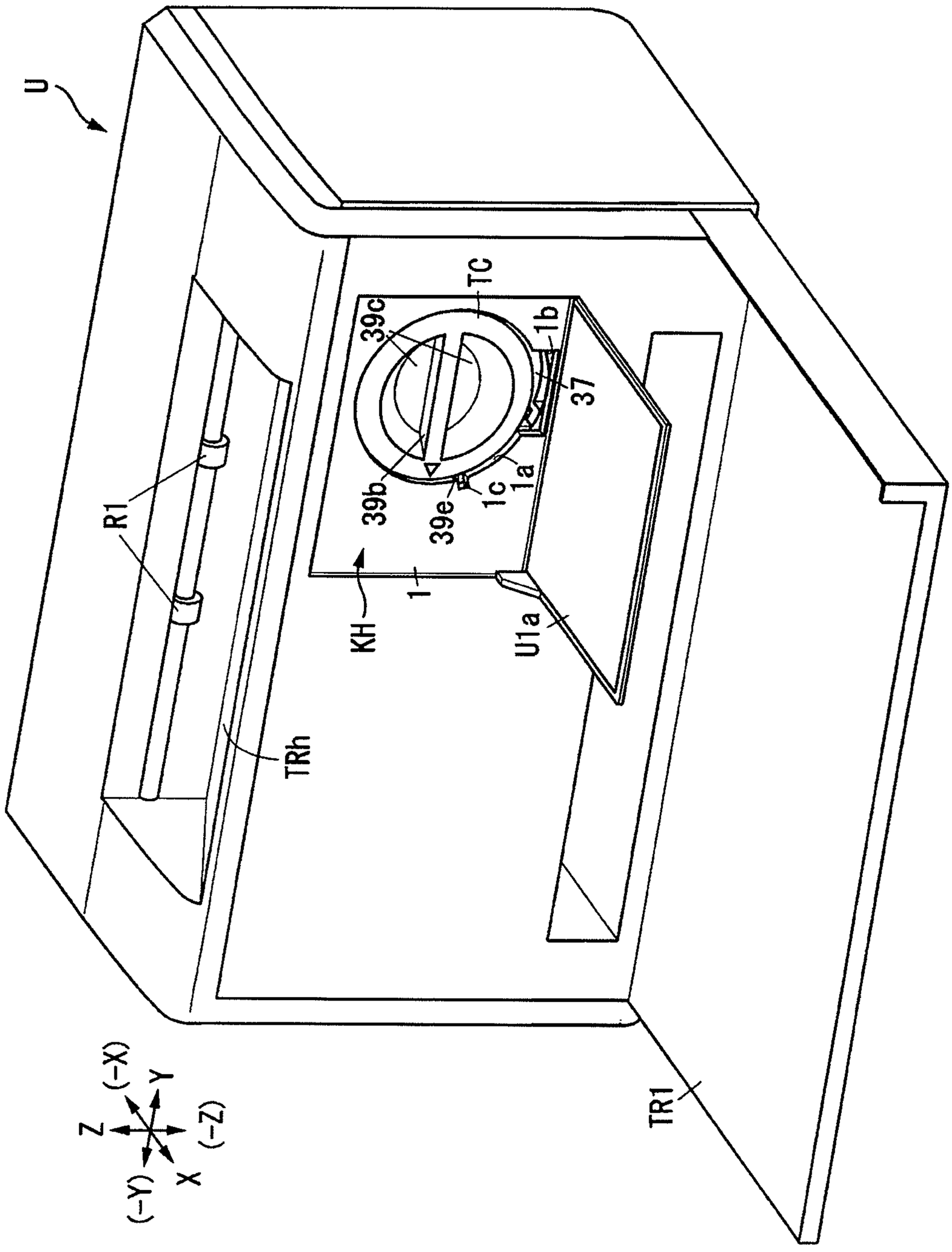


FIG. 5

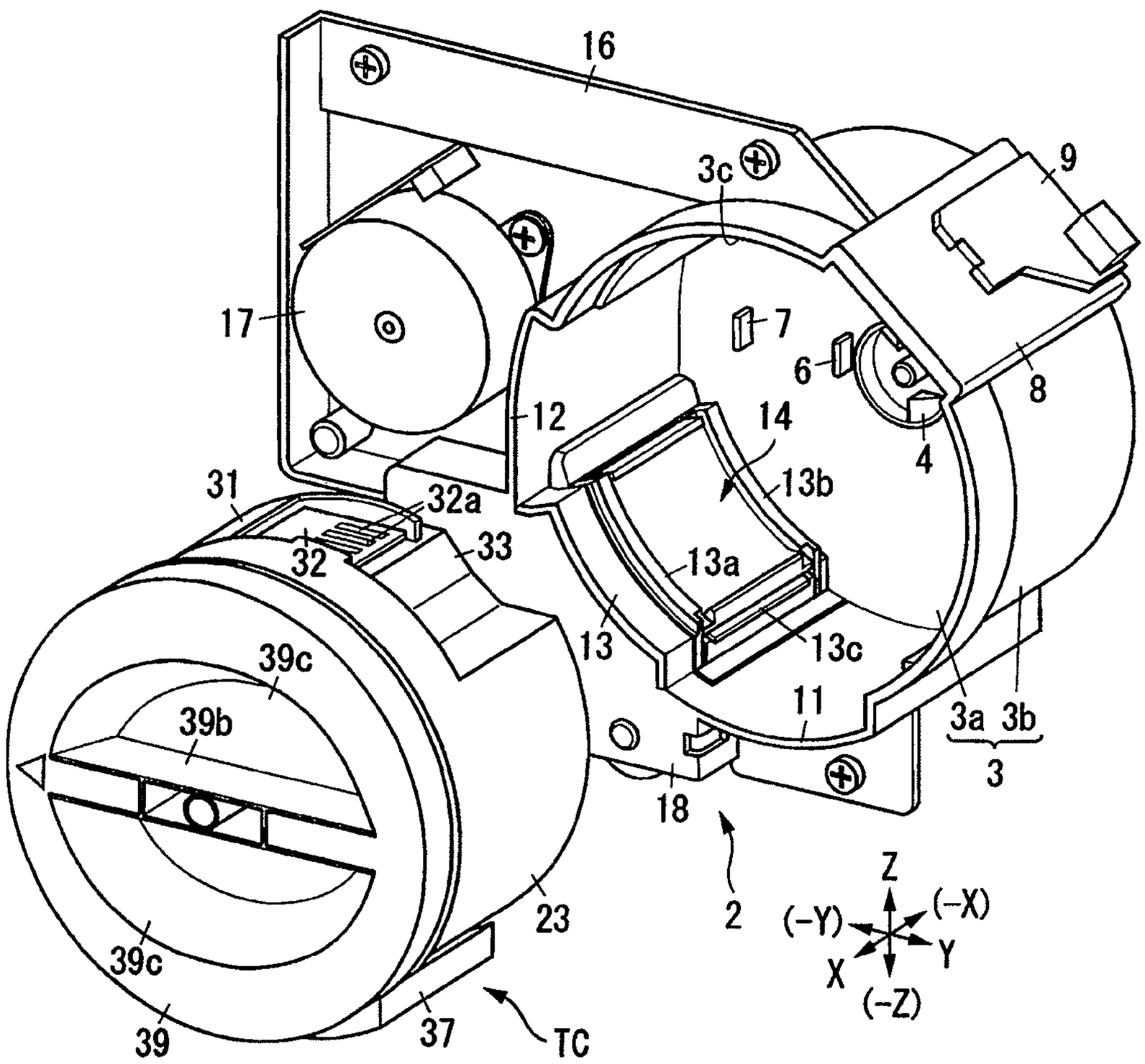

16
3c
9
17
7
6
8
12
14
4
13b
31
32a
33
32
13a
13
13c
11
3a 3b
3
18
39c
39b
2
Z
(−Y)
(−X)
Y
X
(−Z)
23
39c
39
37
TC

FIG. 6

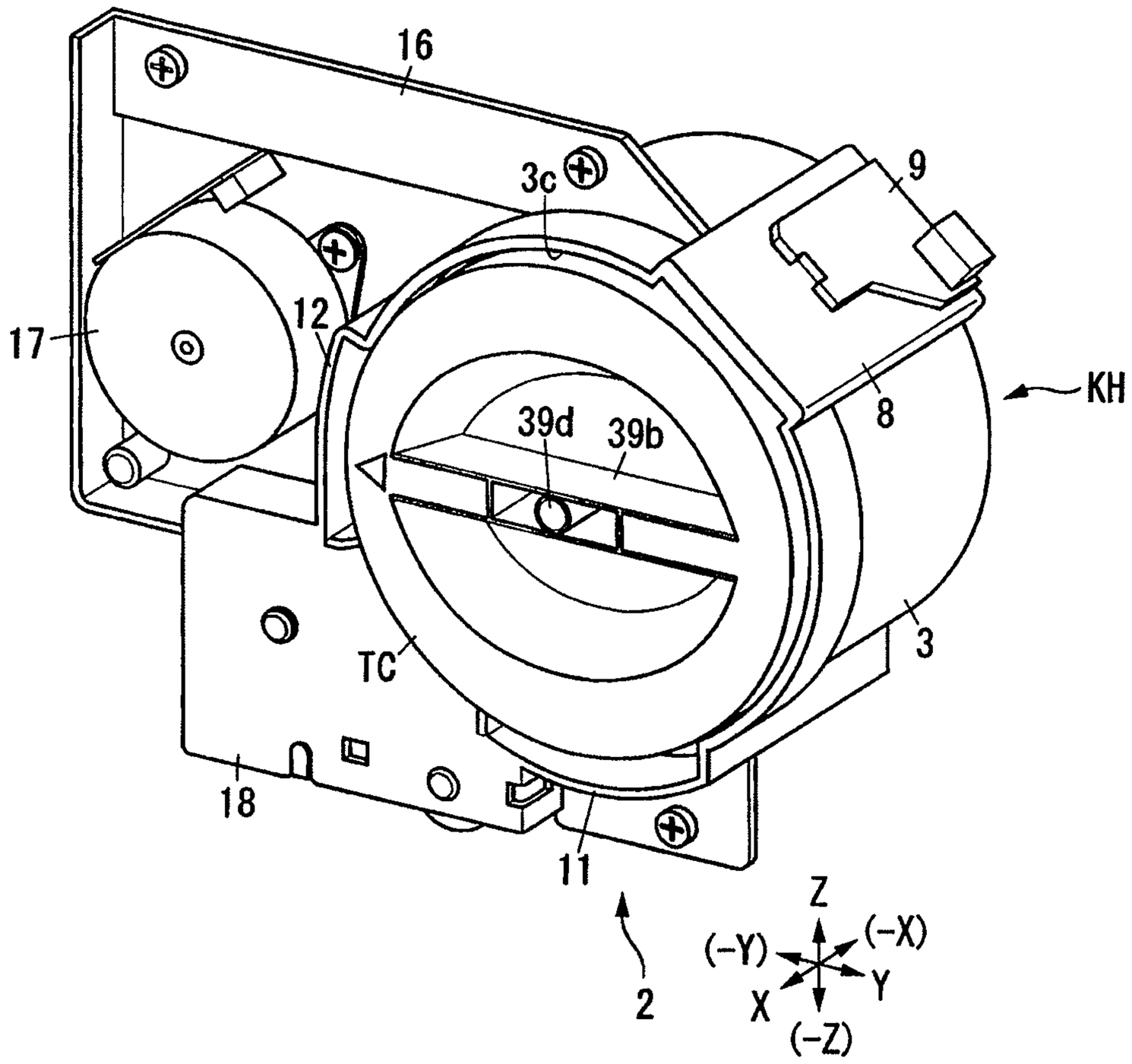


FIG. 7

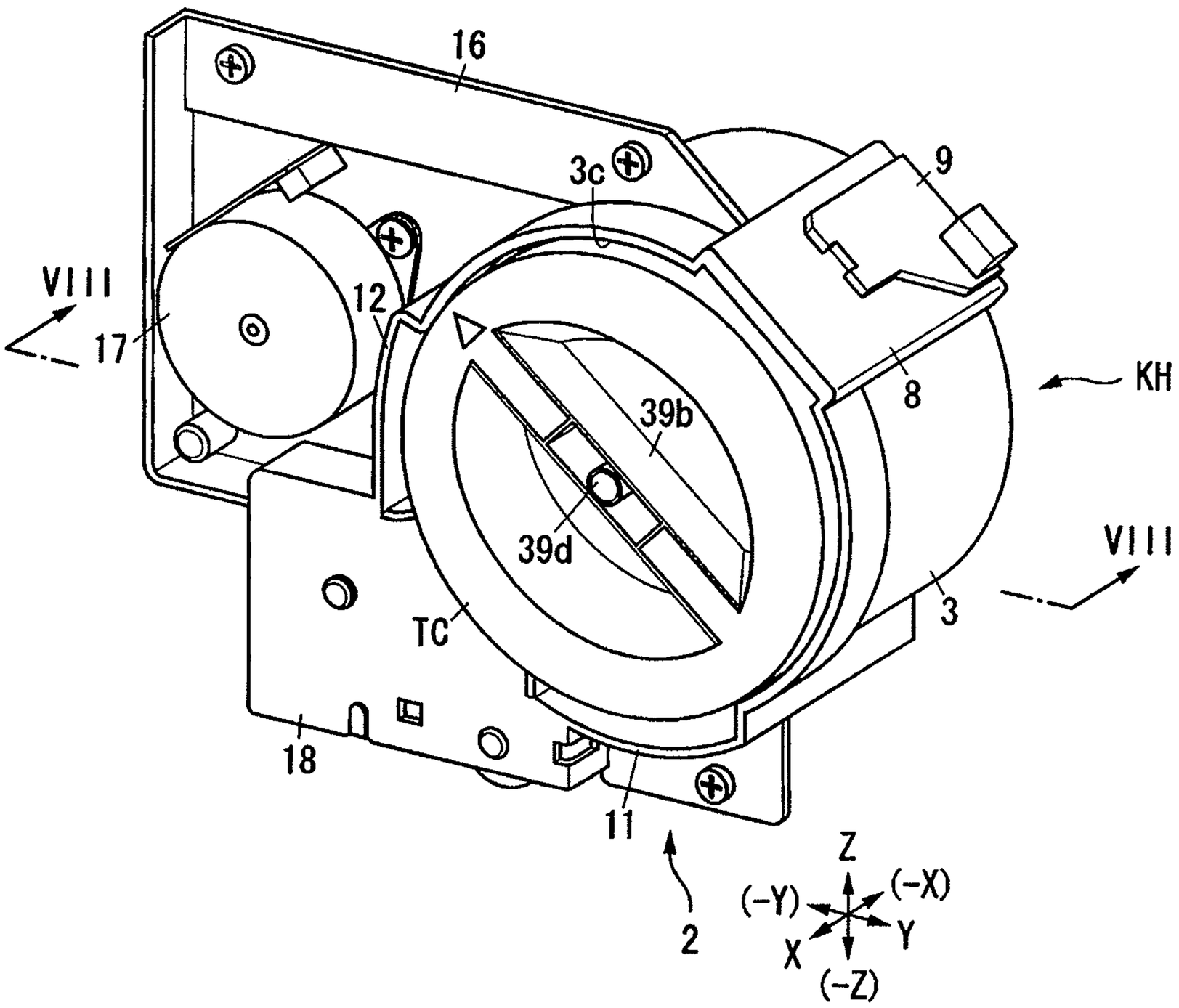


FIG. 8

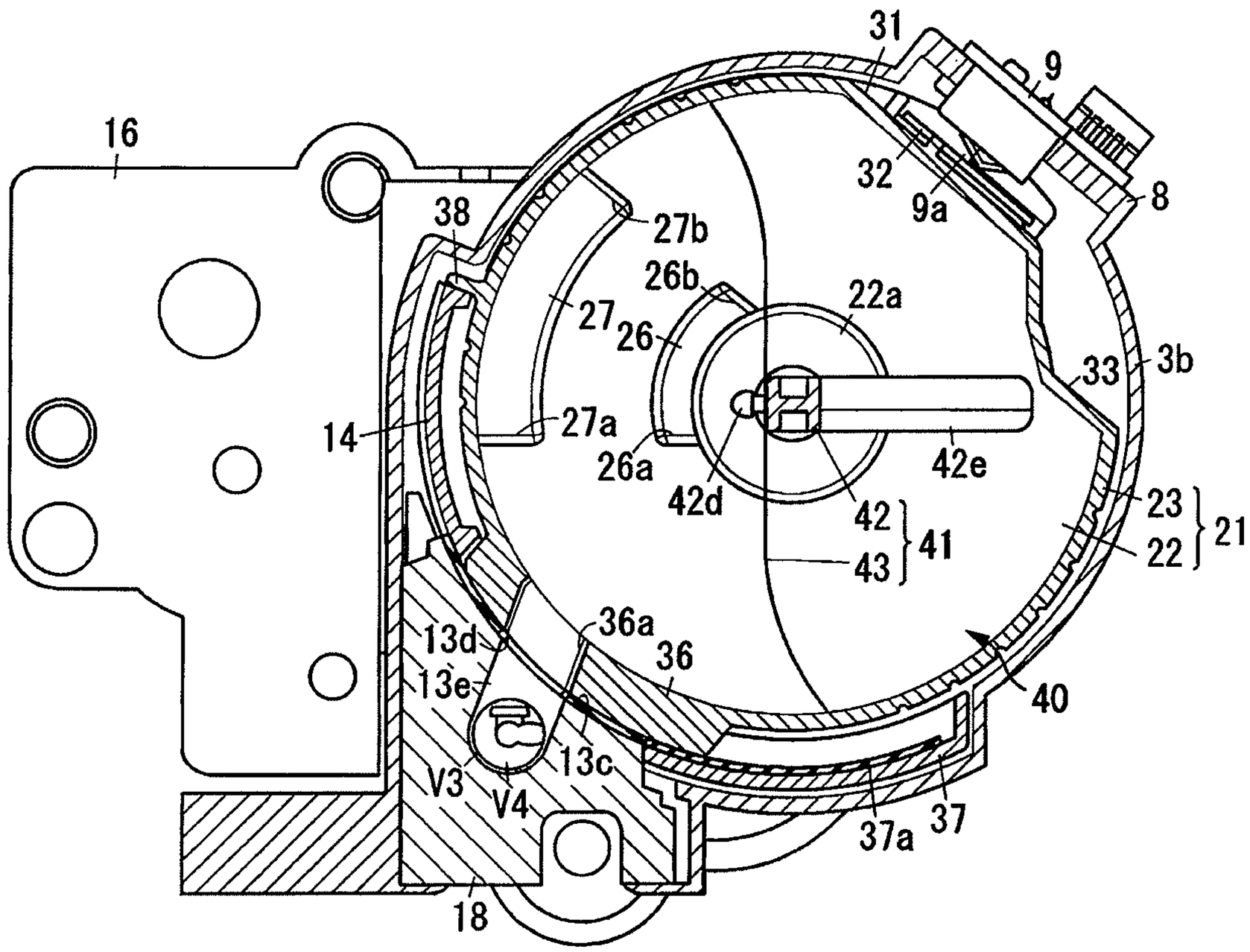

31
9
16
32
9a
8
38
27b
26b
22a
27
26
33
3b
14
27a
26a
42d
42e
42
41
43
23
22
21
13d
36a
36
13e
40
13c
V3
V4
37a
37
18

FIG. 9

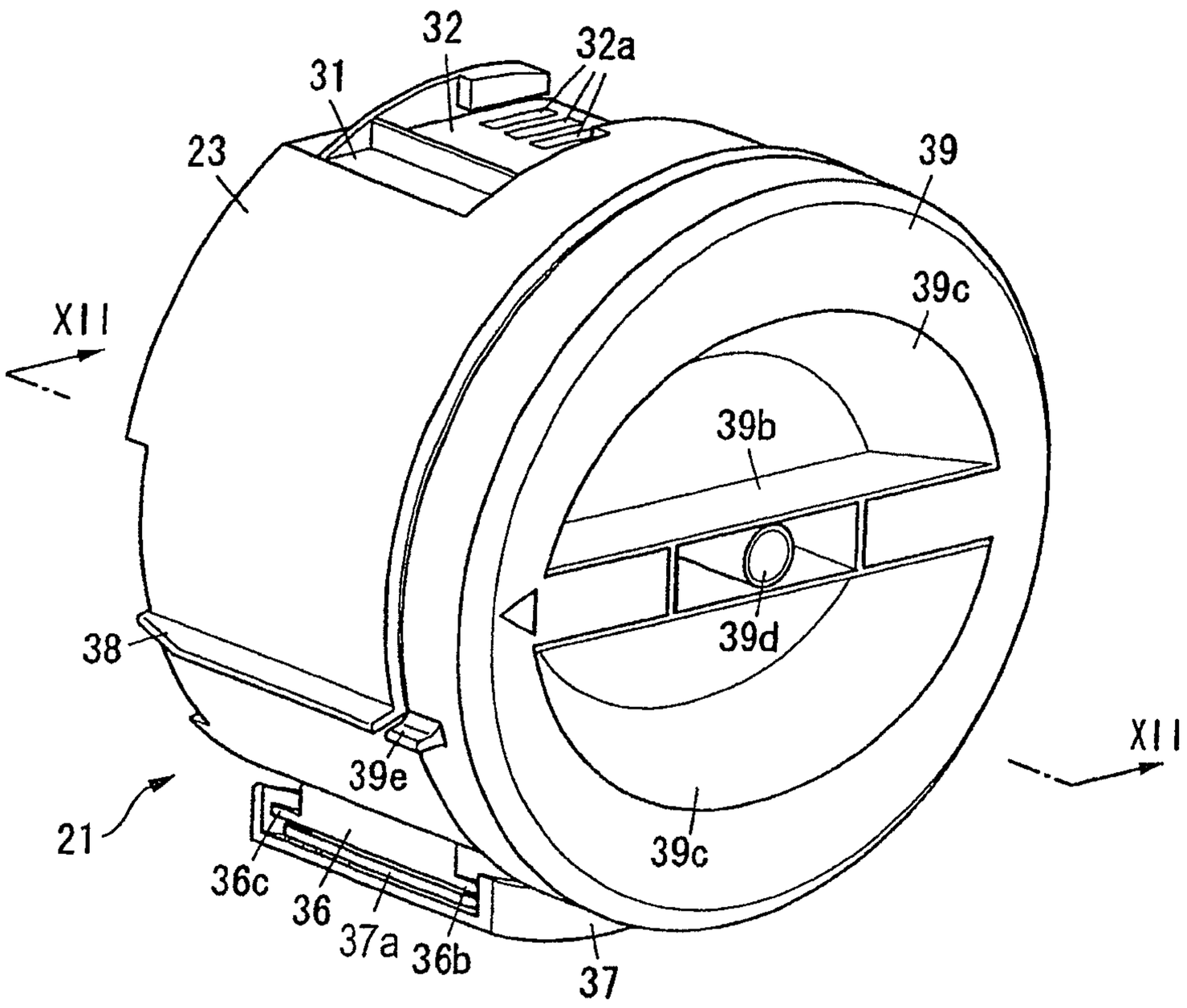
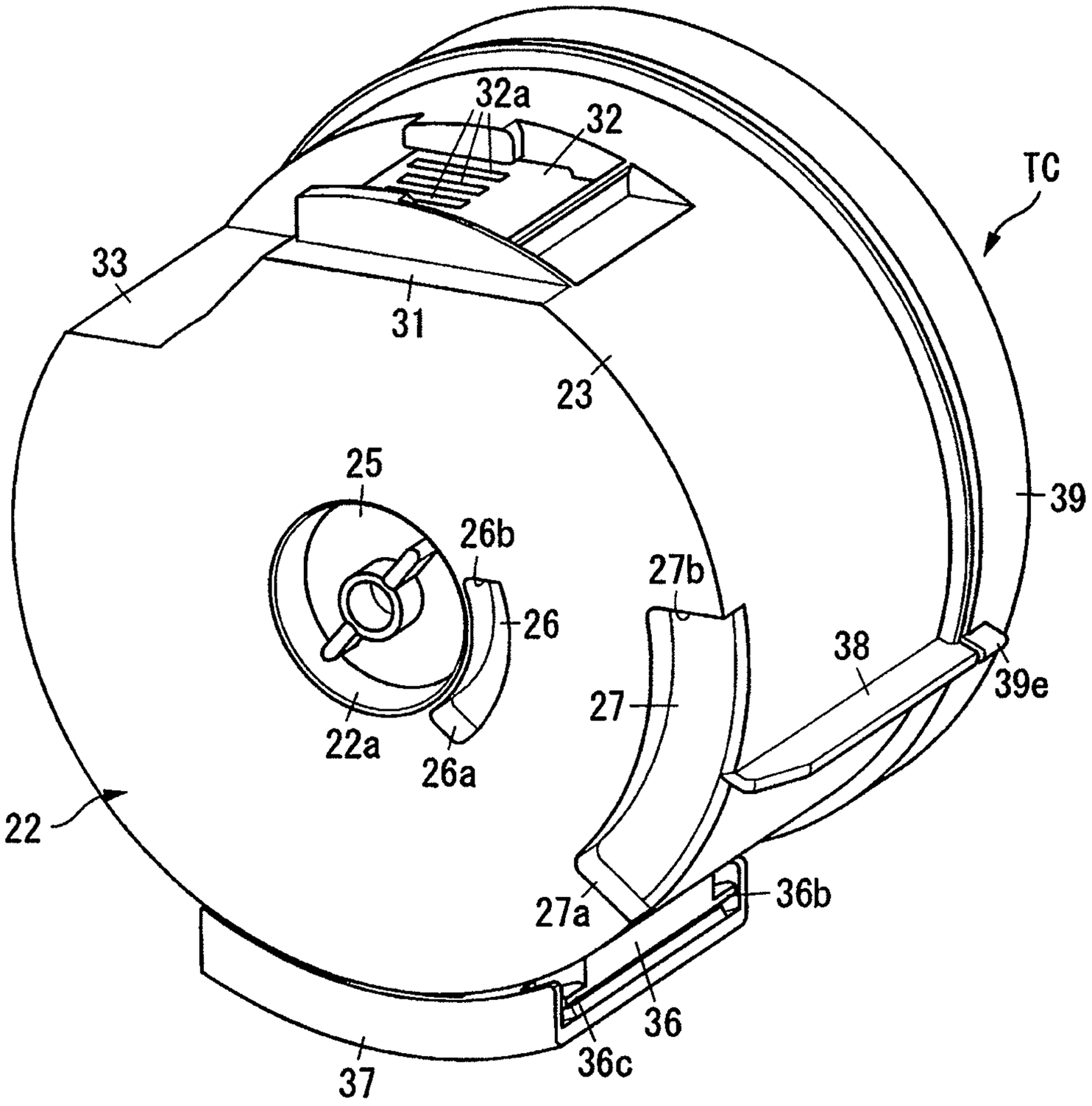


FIG. 10


32a
32
TC
33
31
23
25
26b
27b
39
26
38
39e
27
22a
26a
22
27a
36b
36
36c
37

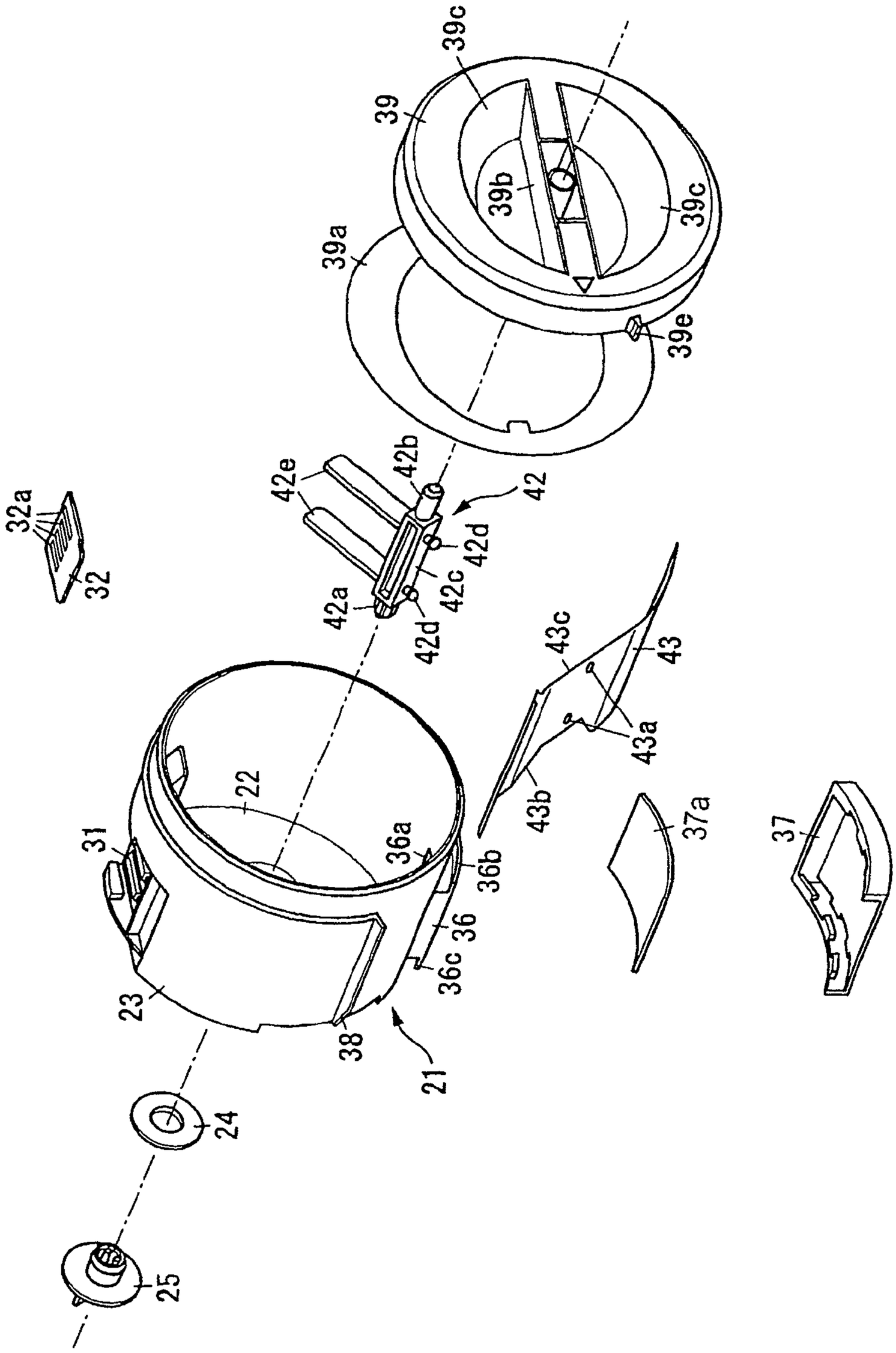

39c
39
39b
39c
39a
39e
42e
42b
42
42d
42c
42a
42d
32a
32
43c
43
43a
43b
22
31
36a
36b
36
36c
37a
37
23
38
24
25
21

FIG. 11

FIG. 12

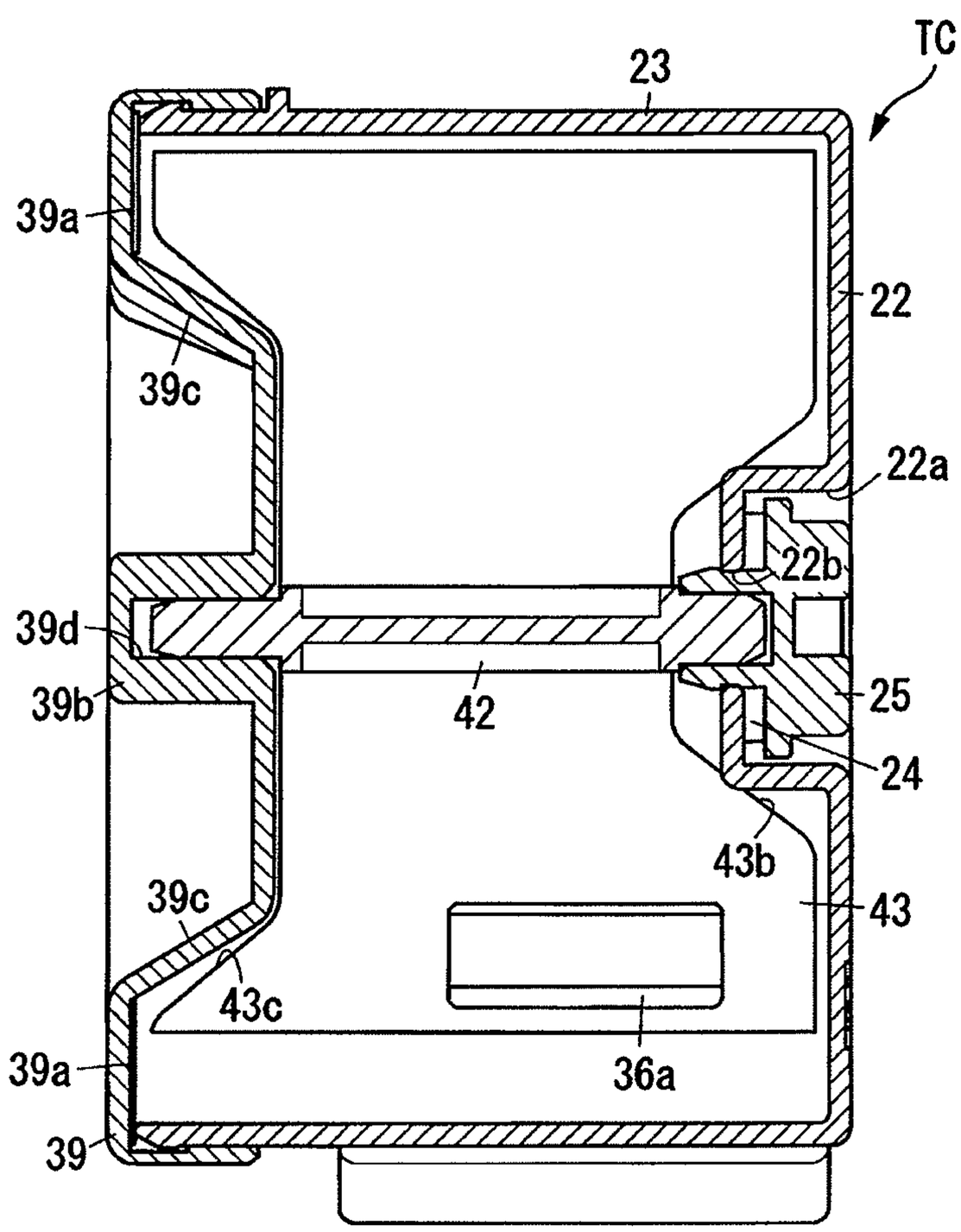


FIG. 13

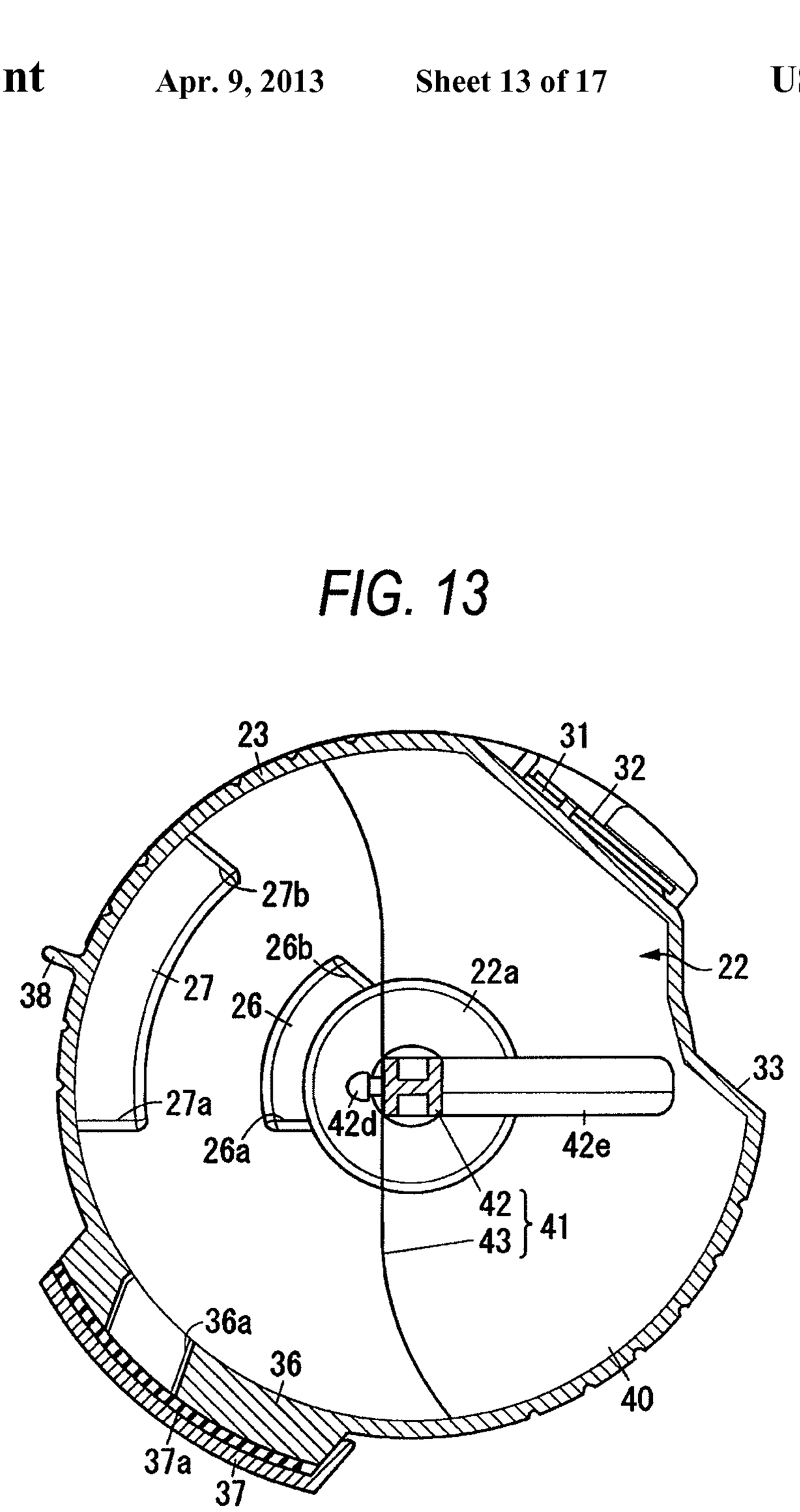

23
31
32
27b
26b
22a
22
38
27
26
33
27a
42d
42e
26a
42
41
43
36a
36
40
37a
37

FIG. 14

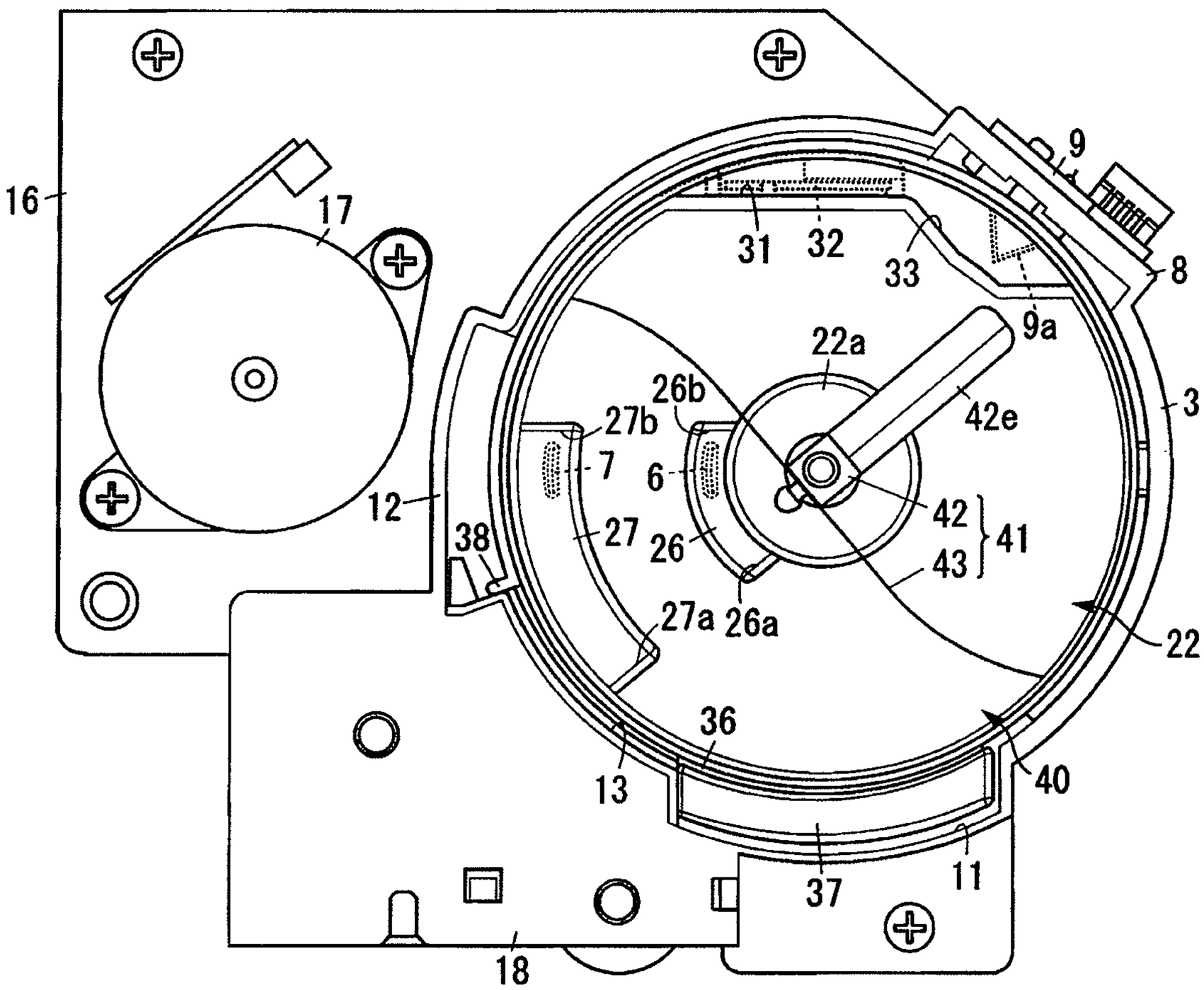

16
17
9
31
32
33
8
9a
22a
26b
27b
7
6
12
38
27
26
42
41
43
42e
3
27a
26a
22
36
13
40
37
11
18

FIG. 15

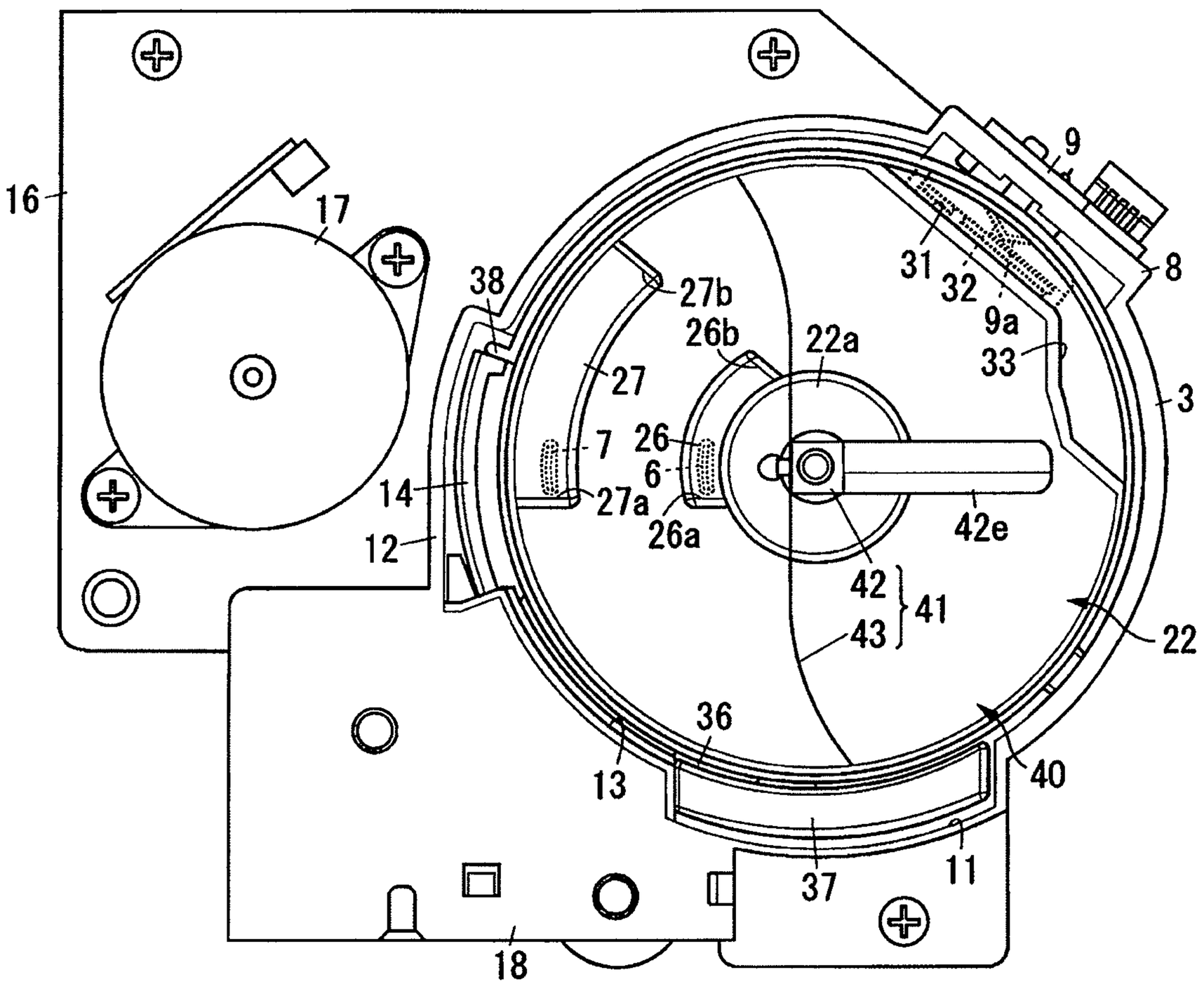

16
17
38
27b
26b
22a
9
31
32
9a
33
8
3
27
7
26
6
14
27a
26a
42e
12
42
41
43
22
36
13
40
37
11
18

FIG. 16

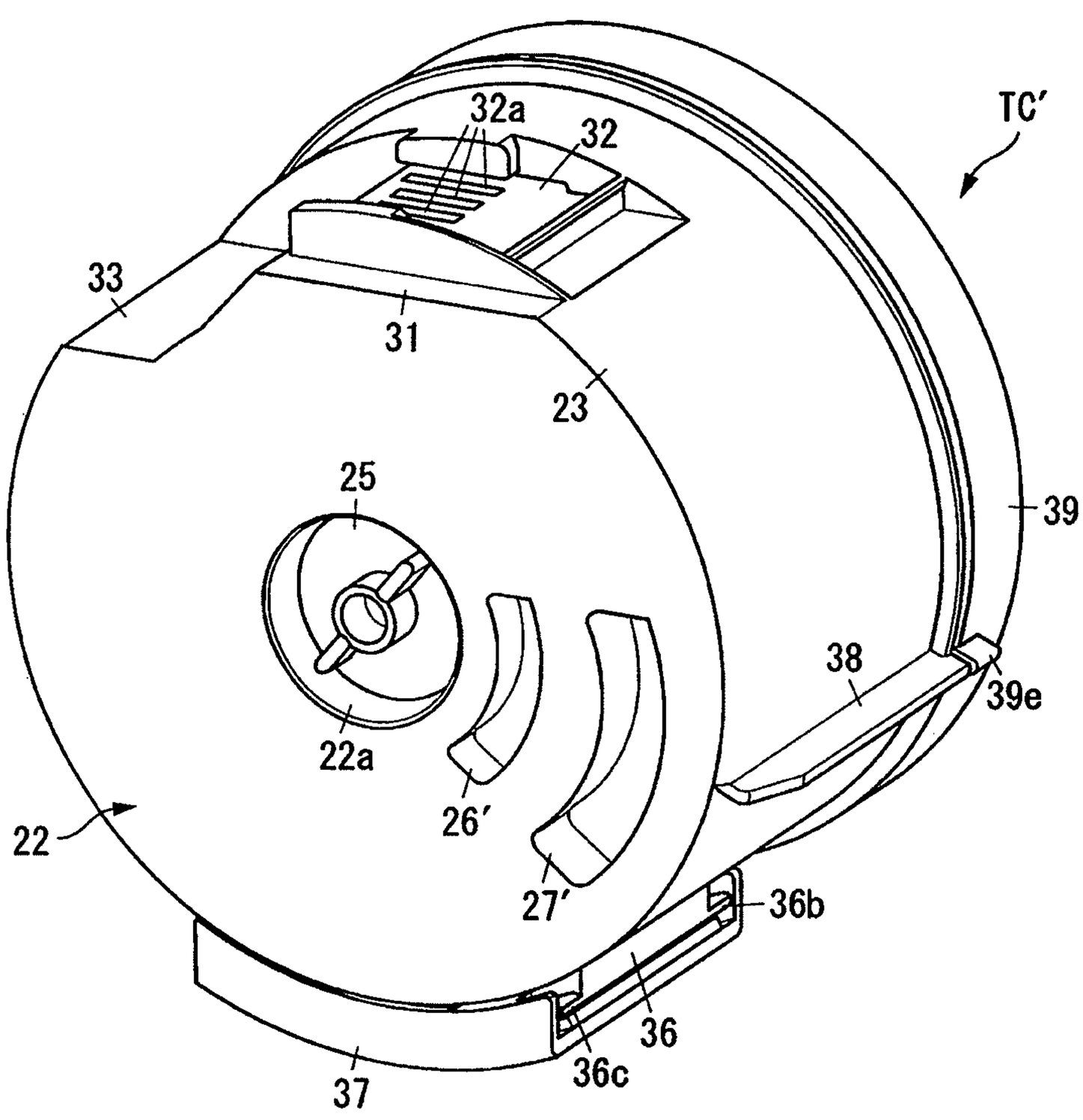
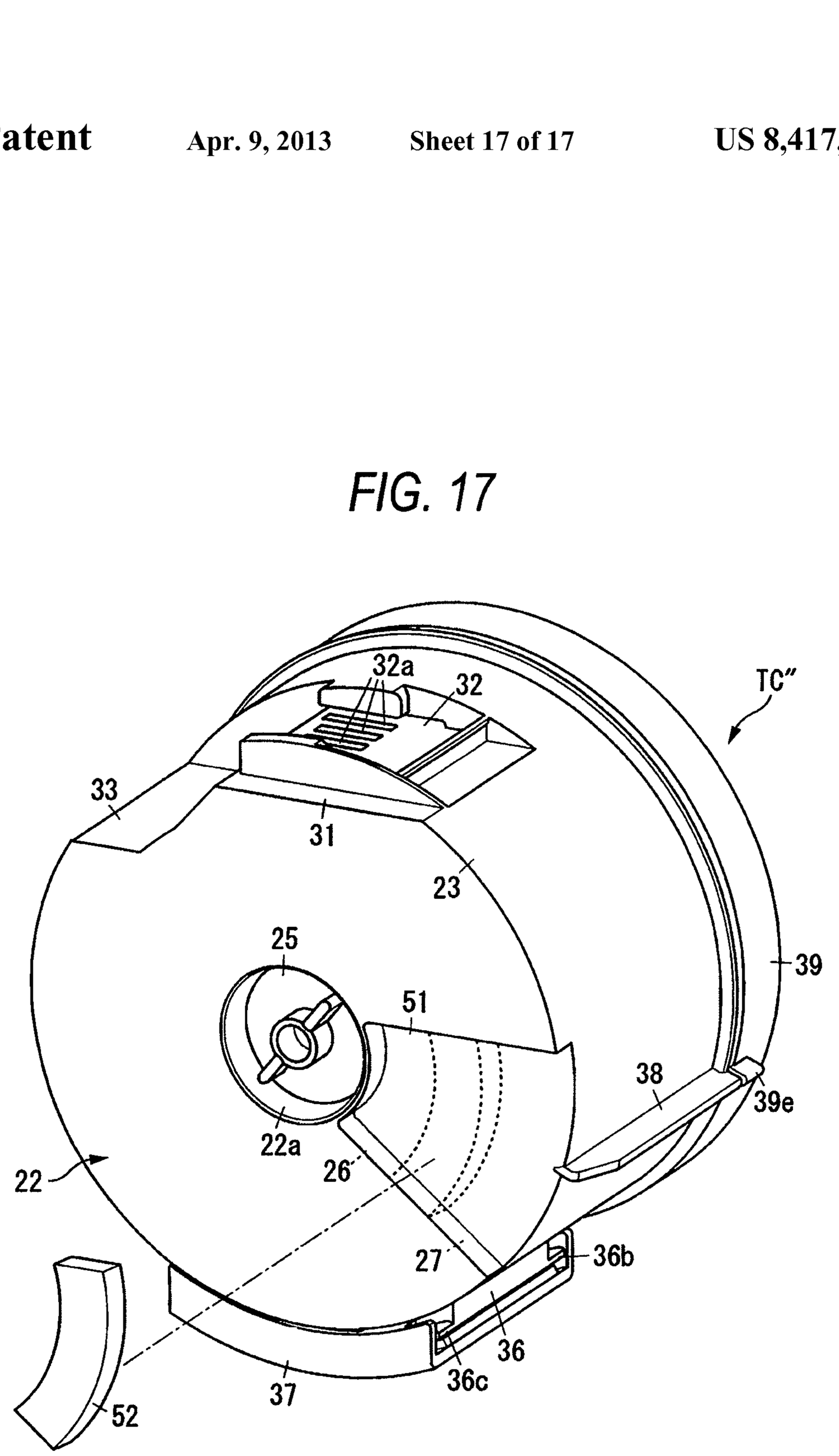


FIG. 17



DEVELOPER STORAGE CONTAINER HAVING A TURN STOP PART

CROSS-REFERENCE TO RELATED APPLICATIONS

This application is based on and claims priority under 35 USC 119 from Japanese Patent Application No. 2009-140298 filed on Jun. 11, 2009.

BACKGROUND

1. Technical Field

This invention relates to a developer storage container and an image forming apparatus.

2. Related Art

In image forming apparatus of a copier, a printer, etc., arts relating to a developer storage container, there is a toner cartridge to be supplied with a developer consumed with image forming processing.

SUMMARY

According to an aspect of the invention, a developer storage container includes a container main body, an outflow port, an open/closed member and a turn stop part. A developer is stored in the container main body. The container main body is configured to be attached to and detached from an attachment section provided in an image forming apparatus main body. And, the container main body is configured to at least rotate in a state that the container main body is inserted into the attachment section, to a detachable position at which the container main body can be detached from the attachment section and an undetachable position at which the container main body cannot be detached from the attachment section. The outflow port is formed in the container main body and from which the developer flows out. The open/closed member moves relatively to the outflow port based on a rotation of the container main body. The open/closed member is supported so as to move to an opened position at which the outflow port is opened and a closed position at which the outflow port is closed. The open/closed member moves to the closed position when the container main body moves to the detachable position. The open/closed member moves to the opened position when the container main body moves to the undetachable position. And, the turn stop part is formed on a wall face of the container main body, the wall face being provided on a downstream side in a insertion direction in which the container main body is inserted into the attachment section. The turn stop part is dented to an upstream side in the insertion direction and has a circular arc shape being concentric with a rotation direction of the container main body. The turn stop part is configured to engage with a convex part which (i) projects to the upstream side in the insertion direction, (ii) is provided in the attachment section and (iii) is formed at a different position in response to the image forming apparatus body. The turn stop part has at least a central angle corresponding to a rotation angle at which the container main body rotates to the detachable position and the undetachable position. And, the turn stop part comes in contact with the convex part when the open/closed member moves to the opened position.

BRIEF DESCRIPTION OF THE DRAWINGS

Exemplary embodiment(s) of the present invention will be described in detail based on the following figures, wherein:

FIG. **1** is a perspective view of an image forming apparatus of exemplary embodiment 1;

FIG. **2** is a general schematic representation of the image forming apparatus of Exemplary embodiment 1;

FIG. **3** is a schematic representation in a state in which a front cover of the image forming apparatus of exemplary embodiment 1 is opened;

FIG. **4** is a schematic representation in a state in which a toner cartridge rotates and moved from an undetachable position shown in FIG. **3** to a detachable position;

FIG. **5** is a main part schematic representation in a state in which the toner cartridge is removed from a cartridge holder;

FIG. **6** is a main part schematic representation in a state in which the toner cartridge is placed in the cartridge holder;

FIG. **7** is a schematic representation in a state in which the toner cartridge placed in the cartridge holder rotates to the undetachable position;

FIG. **8** is a sectional view taken on line VIII-VIII in FIG. **7**;

FIG. **9** is a perspective view of viewing the toner cartridge from the slanting front;

FIG. **10** is a perspective view of viewing the toner cartridge from the slanting rear;

FIG. **11** is an exploded view of the toner cartridge;

FIG. **12** is a sectional view taken on line XII-XII in FIG. **9**;

FIG. **13** is a sectional view of the toner cartridge portion in FIG. **8**;

FIG. **14** is a main part schematic representation of the toner cartridge in a state in which it moves to a detachable position;

FIG. **15** is a main part schematic representation of the toner cartridge in a state in which it moves to an undetachable position;

FIG. **16** is a schematic representation of a change example of exemplary embodiment 1 and is a drawing corresponding to FIG. **10** of exemplary embodiment 1; and

FIG. **17** is a schematic representation of a developer storage container of exemplary embodiment 2 and is a drawing corresponding to FIG. **10** of exemplary embodiment 1.

DETAILED DESCRIPTION

Exemplary embodiments as specific examples of the mode for carrying out the invention will be discussed with reference to the accompanying drawings. However, the invention is not limited to the following exemplary embodiments.

For easy understanding of the description to follow, in the accompanying drawings, back and forth direction is X axis direction, side to side direction (left-right direction) is Y axis direction, and up and down direction is Z axis direction, and directions or sides indicated by arrows X, −X, Y, −Y, Z, and −Z are forward, backward, rightward, leftward, upward, and downward or front, rear (back), right, left, upper side (top), and lower side (bottom).

In the accompanying drawings, a mark including a dot described in a circle means an arrow from the back of the plane of the drawing to the surface and a mark including X described in a circle means an arrow from the surface of the plane of the drawing to the back.

In the description that follows using the accompanying drawings, members other than the members required for the description are not shown in the drawings where appropriate for easy understanding of the description.

Exemplary Embodiment 1

FIG. **1** is a perspective view of an image forming apparatus of exemplary embodiment 1.

In FIG. **1**, a printer U as an example of the image forming apparatus of exemplary embodiment 1 is provided in a front lower part with a sheet feed tray TR**1** as an example of a sheet feed section for storing a sheet S as an example of a medium. A discharge tray TRh is formed on an upper face of the printer U as an example of a discharge section to which the sheet S with an image recorded thereon is discharged. A front cover U**1***a* is formed in a front right part of the printer U as an example of an open/closed section opened and closed when a toner cartridge as an example of a developer storage container described later is operated.

FIG. **2** is a general schematic representation of the image forming apparatus of exemplary embodiment 1.

In FIG. **2**, the printer U has a controller C as an example of a control section, an image processing section IPS whose operation is controlled by the controller C, a laser drive circuit DL as an example of a latent image forming circuit, a power supply unit E, and the like. The power supply unit E applies a voltage to a charging roll CR as an example of a charger described later, a developing roller Ga as an example of a developing member, a transfer roller Tr as an example of a transfer member, and the like.

The image processing section IPS converts print information input from a computer, etc., as an example of an external information transmission apparatus into image information for forming a latent image and outputs the image information to the laser drive circuit DL at a preset timing. The laser drive circuit DL outputs a drive signal to a latent image forming unit LH in response to the input image information. The latent image forming unit LH of exemplary embodiment 1 is implemented as an LED head with LEDs as an example of latent image write elements placed linearly at preset intervals along the left-right direction.

A photoconductive body PR as an example of a rotating image holding body is supported in a back part of the printer U. The photoconductive body PR is surrounded by the charging roller CR, the latent image forming unit LH, a developing device G, the transfer roll Tr, and a photoconductive body cleaner CL as an example of a cleaner for the image holding body along the rotation direction of the photoconductive body PR.

In FIG. **2**, a charging roll cleaner CRc as an example of a cleaner for the charger for cleaning the surface of the charging roll CR is opposed to and is in contact with the charging roll CR.

The developing device G has a developing container V in which a developer is stored. Placed in the developing container V are a developing roll Ga as an example of a developer holding body opposed to the photoconductive body PR, a pair of circulating conveying members Gb and Gc for circulating and conveying a developer while agitating the developer, a supply member Gd for conveying the developer agitated by the circulating conveying members to the developing roll Ga, and a layer thickness regulation member Ge for regulating the layer thickness of the developer on the surface of the developing roll Ga.

A developer supplying port V**1** is formed on the front upper face of the developing container V as an example of a supplying member. A developer supplying passage V**3** extending forward as an example of a developer conveying passage is joined to the developer supplying port V**1**. A supplying auger V**4** as an example of a developer conveying member is rotatably supported in the developer supplying passage V**3**. A cartridge holder KH as an example of as attachment/detachment part where a toner cartridge TC is attached and detached is joined to the front end of the developer supplying passage V**3**, and a developer from the toner cartridge TC flows thereinto. Therefore, when the supplying auger V**4** is driven in response to the consumption amount of the developer in the developing device G, the developer is supplied from the toner cartridge TC to the developing device G.

The surface of the rotating photoconductive body PR is charged by the charging roll CR in a charging area Q**1** and an electrostatic latent image is formed by latent image forming light emitted from the latent image forming unit LH at a latent image forming position Q**2**. The electrostatic latent image is developed to a toner image as an example of a visible image by the developing roll Ga in a developing area Q**3** and the toner image is transferred to a record sheet S as an example of a medium by the transfer roll Tr in a transfer area Q**4** formed by an opposed area of the photoconductive body PR and the transfer roll Tr. The remaining toner on the surface of the photoconductive body PR is removed by a cleaning blade CB as an example of a cleaning member in a cleaning area Q**5** as an example of a cleaning area downstream of the transfer area Q**4** and is collected in the photoconductive body cleaner CL.

A film sheet FS as an example of a scatter prevention member is provided on the opposed side of the cleaning blade CB and prevents the toner collected in the photoconductive body cleaner CL from spilling on the outside.

In FIG. **2**, a pickup roll Rp as an example of a medium taking-out member is placed in the sheet feed tray TR**1** in the lower part of the printer U. The record sheets S taken out by the pickup roll Rp are separated one sheet at a time by a separation roll Rs having a sheet feed roll and a retard roll as an example of a medium separation member, and each sheet is conveyed by a sheet conveying roll Ra as an example of a medium conveying member placed along a sheet conveying passage SH and is conveyed to the transfer area Q**4** at a preset timing by a registration roll Rr as an example of a timing adjustment member placed upstream in the sheet conveying direction of the transfer area Q**4**.

The transfer roll Tr to which a transfer voltage is applied from the power supply unit E, etc., whose operation is controlled by the controller C transfers the toner image on the photoconductive body PR to the record sheet S passing through the transfer area Q**4**.

The record sheet S to which the toner image has been transferred in the transfer area Q**4** is conveyed to a fixing unit F in a state in which the toner image is unfixed. The fixing unit F has a pair of fixing rolls Fh and Fp as an example of a fixing member and a fixing area Q**6** is formed by a press contact area of the pair of fixing rolls Fh and Fp. The record sheet S conveyed to the fixing unit F has the toner image fixed by the pair of fixing rolls Fh and Fp in the fixing area Q**6**. The record sheet S formed with the fixed toner image is guided by sheet guides SG**1** and SG**2** as an example of a medium guide member and is discharged from a discharge roll R**1** as an example of a discharge member to the discharge tray TRh on the upper face of a printer main body U**1**.

(Description of Cartridge Holder)

FIG. **3** is a schematic representation in a state in which the front cover of the image forming apparatus of exemplary embodiment 1 is opened.

FIG. **4** is a schematic representation in a state in which the toner cartridge rotates and moved from an undetachable position shown in FIG. **3** to a detachable position.

In FIGS. **1**, **3**, and **4**, if the front cover U**1***a* of the printer U of exemplary embodiment 1 is moved from a usual position shown in FIG. **1** to an operation position shown in FIGS. **3** and **4**, the toner cartridge TC and the cartridge holder KH where the toner cartridge TC is placed are exposed to the outside.

FIG. **5** is a main part schematic representation in a state in which the toner cartridge is removed from the cartridge holder.

FIG. **6** is a main part schematic representation in a state in which the toner cartridge is placed in the cartridge holder.

FIG. **7** is a schematic representation in a state in which the toner cartridge placed in the cartridge holder rotates to the undetachable position.

FIG. **8** is a sectional view taken on line VIII-VIII in FIG. **7**.

In FIGS. **3** and **4**, the cartridge holder KH supported on the printer main body U**1** as an example of an image forming apparatus main body has a front panel **1** as an example of a front member. The front panel **1** is formed with a circular-hole-shaped opening **1***a* where the toner cartridge TC is attached and detached. A shutter passage part **1***b* dented downward as an example of open/closed member passage part is formed at the lower end of the opening **1***a*. And a protrusion passage part **1***c* shaped like a cut is formed at the left of the opening **1***a*.

In FIGS. **5** to **8**, a holder main body **2** as an example of an attachment/detachment section main body is supported in the front panel **1**. The holder main body **2** has a cartridge storage section **3** formed as a cylindrical concave part with the back and forth direction of the cartridge attachment/detachment direction as the axial direction as an attachment/detachment section (which is an example of an attachment section).

In FIG. **5**, the cartridge storage section **3** has a disk-like rear end wall **3***a* and a tubular wall **3***b* extending forward from the rear end wall **3***a*. A drive coupling **4** as an example of a drive transmission member is rotatably supported in the center of the rear end wall **3***a*. A pair of left and right positioning projections **6** and **7** projecting forward, upstream in the cartridge insertion direction as an example of convex part is formed at the left of the drive coupling **4**.

In FIGS. **5** to **8**, a reader support section **8** dented right upward relative to an inner peripheral surface **3***c* of the tubular wall **3***b* as an example of a read support section is formed in the upper right part of the tubular wall **3***b*. A CRUM reader **9** that can transmit and receive information and read and write information as an example of an information reader/writer is supported in the reader support section **8**. In FIG. **8**, the CRUM reader **9** has a connector **9***a* implemented as a plate spring projecting to the inside of the tubular wall **3***b* as an example of a contact terminal.

In FIGS. **5** to **8**, a shutter storage section **11** dented downward relative to the inner peripheral surface **3***c* of the tubular wall **3***b*, namely, to the outside in the diametric direction of the tubular wall **3***b* as an example of an open/closed storage section is formed in a lower part of the tubular wall **3***b*.

A protrusion storage concave part **12** shaped like circular art, dented at the left relative to the inner peripheral surface **3***c* of the tubular wall **3***b*, namely, to the outside in the diametric direction of the tubular wall **3***b* as an example of a protrusion storage part is formed at the left of the tubular wall **3***b*.

In FIGS. **5** and **8**, an inflow port part **13** extending along the circumferential direction of the tubular wall **3***b* is formed between the shutter storage section **11** and the protrusion storage concave part **12** of the tubular wall **3***b*. In FIG. **5**, the inflow port part **13** is formed with a pair of back and forth shutter guides **13***a* and **13***b* as an example of a guide member, and an inflow port shutter **14** as an example of an inflow opening/closing member is supported movably along the circumferential direction of the tubular wall **3***b* between the shutter guides **13***a* and **13***b*.

In FIGS. **5** and **8**, the inflow port part **13** has an inflow face **13***c* formed between the shutter guides **13***a* and **13***b* and formed like a step one step lower than the inner peripheral surface **3***c* of the tubular wall **3***b* and one step higher than an upper face of the shutter storage section **11**.

In FIG. **8**, the inflow face **13***c* is formed with an inflow port **13***d* below the inflow port shutter **14** and an inflow passage **13***e* extending downward from the inflow port **13***d*, and the lower end of the inflow passage **13***e* is connected to the upstream end of the developer supplying passage V**3**.

In FIGS. **5** to **8**, a motor support plate **16** extending to the left as an example of a drive support member is supported in the cartridge storage section **3**, and a cartridge motor **17** as an example of a drive source is supported in the motor support plate **16**.

A gear support part **18** as an example of a transmission system support part is formed below the motor support plate **16**. A gear train having a plurality of gears (not shown) for transmitting drive from the cartridge motor **17** to the drive coupling **4**, the supplying auger V**4**, etc., is supported in the gear support part **18**.

(Description of Toner Cartridge)

FIG. **9** is a perspective view of viewing the toner cartridge from the slanting front.

FIG. **10** is a perspective view of viewing the toner cartridge from the slanting rear.

FIG. **11** is an exploded view of the toner cartridge.

FIG. **12** is a sectional view taken on line XII-XII in FIG. **9**.

FIG. **13** is a sectional view of the toner cartridge portion in FIG. **8**.

FIG. **14** is a main part schematic representation of the toner cartridge in a state in which it moves to a detachable position.

FIG. **15** is a main part schematic representation of the toner cartridge in a state in which it moves to an undetachable position.

FIGS. **14** and **15** are schematic representations in a state in which the toner cartridge is viewed from the front in a state in which a cartridge cover is removed at the detachable position or the undetachable position.

In FIGS. **5** to **15**, the toner cartridge TC attached to and detached from the cartridge holder KH has a cylindrical cartridge main body **21** having a rotation shaft extending in the insertion direction or the back and forth direction of the attachment/detachment direction as an example of a container main body. The cylindrical cartridge main body **21** has a tube part **22**+**23** made up of a disk-like rear end wall **22** as an example of a bottom wall formed ahead in the insertion direction or at the rear end in the back and forth direction and a tubular wall **23** extending forward from the rear end wall **22**. In FIGS. **10** and **12**, a cylindrical transmission storage section **22***a* dented to the front is formed in the center of the rear end wall **22** and an opening **22***b* piercing in the back and forth direction is formed in the transmission storage section **22***a*. In FIG. **11**, in the transmission storage section **22***a*, a driven coupling **25** meshing with the drive coupling **4** as an example of a transmitted member through a coupling seal **24** as an example of a leakage prevention member is supported in the opening **22***b* for rotation.

In FIGS. **8**, **10**, and **12** to **15**, the rear end wall **22** is formed with positioning grooves **26** and **27** in a forward dent shape upstream in the insertion direction or the attachment direction corresponding to the positioning projections **6** and **7** as an example of a turn stop part. The positioning grooves **26** and **27** of exemplary embodiment 1 each has a circular arc shape being concentric with the opening **22***a* of the center of the rear end wall **22** as the center and are formed so as to be able to engage the positioning projections **6** and **7**.

In exemplary embodiment 1, the central angles of the positioning grooves **26** and **27** each like a circular arc are set to the same and the central angle is set corresponding to the rotation

angle at which the toner cartridge TC rotates between an unlock position as an example of the detachable position shown in FIGS. **4** and **14** and a positioning position as an example of the undetachable position shown in FIGS. **3** and **15**. However, it may be set large at a predetermined angle on the opposite side to the positioning position from the detachable position. Further, the central angles of the positioning grooves **26** and **27** each like a circular arc may be set to different angles. As other examples of the undetachable position, a position rotated only at an arbitrary angle, the position before the toner cartridge TC rotated toward the positioning position from the detachable position reaches the positioning position, a position rotated only at an arbitrary angle toward the opposite side to the positioning position from the detachable position, and the like exist.

As shown in FIGS. **14** and **15**, the positioning projections **6** and **7** are held in a state in which they are in contact with or are in a slight spacing from upper end faces **26***b* and **27***b* in the diametric direction toward the rotation center on the upper end sides of the circular arcs of the positioning grooves **26** and **27** into which the positioning projections **6** and **7** are fitted at the unlock position shown in FIG. **14**. Further, at the positioning position shown in FIG. **15**, they are held in a state in which they are in contact with lower end faces **26***a* and **27***a* in the diametric direction toward the rotation center on the lower end sides of the circular arcs of the positioning grooves **26** and **27**.

The positioning grooves **26** and **27** of exemplary embodiment 1 are formed so as to position on a side relative to the rotation center when the toner cartridge TC is rotated to the unlock position, the positioning position, etc. In exemplary embodiment 1, the rotation center is roughly the same as the rotation center where the driven coupling **25** is supported in the opening **22***b* for rotation. At the unlock position shown in FIG. **14**, the upper end faces **26***b* and **27***b* are set roughly horizontal in the direction of nine o'clock of a clock. At the positioning position shown in FIG. **15**, the lower end faces **26***a* and **27***a* are set so as to become roughly horizontal. Therefore, at the positioning position shown in FIG. **15**, the upper end faces **26***b* and **27***b* are set are set so as to be inclined downward in the gravity direction as they are toward the rotation center.

In FIGS. **5**, **8** to **11**, and **13** to **15**, a CRUM holding section **31** dented inward relative to an outer peripheral surface **23***a* of the tubular wall **23** as an example of a storage member holding section is formed at the upper end of the tubular wall **23**. CRUM (Customer Replaceable Unit Memory) **32** formed of a circuit board as an example of an information storage member is placed in the CRUM holding section **31**. The CRUM **32** stores information concerning the toner cartridge such as the compatible model with the toner cartridge TC, the initial fill amount of an internal developer, the remaining amount decreased with use of the developer, whether or not the developer is close to running out, and whether or not the developer runs out.

In FIGS. **9** and **10**, the CRUM **32** has a connector part **32***a* with which the connector **9***a* of the CRUM reader **9** comes in contact as an example of a contact terminal. At the positioning position shown in FIG. **15**, the CRUM **32** comes in contact with the connector **9***a* and the information stored in the CRUM **32** can be read and written. As for contact between the connector part **32***a* of the CRUM **32** and the connector **9***a* of the CRUM reader **9**, more particularly, the connector part **32***a* of the CRUM **32** comes in contact with the connector **9***a* of the CRUM reader **9** at a position at which the toner cartridge TC is rotated toward the positioning position and is rotated only at a predetermined angle, the position before the toner cartridge TC reaches the positioning position. Then, further when the toner cartridge TC is rotated toward the positioning position, the lower end faces **26***a* and **27***a* of the positioning grooves **26** and **27** of the toner cartridge TC come in contact with the positioning projections **6** and **7** and the position in the rotation direction of the toner cartridge TC is determined.

A connector relief part **33** dented inward relative to the outer peripheral surface **23***a* as an example of an interference prevention part is formed at the light of the CRUM holding section **31**. The connector relief part **33** is formed to prevent the tubular wall **23** from coming in contact with the connector part **9***a* of the CRUM reader **9** and causing damage to the connector part **9***a*, etc., when the toner cartridge TC is inserted into the cartridge storage section **3**.

In FIGS. **8** to **11**, an outflow port part **36** projecting downward, outward in the diametric direction from the outer peripheral surface **23***a* of the tubular wall **23** is formed corresponding to the shutter storage section **11** in the lower end part of the tubular wall **23**. In FIGS. **8** and **13**, the outflow port part **36** is formed with an outflow port **36***a* connecting the inner face and the outer face of the tubular wall **23**. The outflow port **36***a* is connected to the inflow port **13***d* at the positioning position shown in FIGS. **8** and **15**. As shown in FIG. **13**, the outflow port **36***a* of exemplary embodiment 1 is formed so as to be inclined downward relative to the diametric direction of the tubular wall **23** and clogging of the developer flowing out from the outflow port **36***a* in the outflow port **36***a* is decreased.

In FIGS. **9** and **10**, the outflow port part **36** is formed with shutter guides **36***b* and **36***c* hanging over to the outside in the back and forth direction in both back and forth end margins of the lower end and extending along the circumferential direction of the tubular wall **23**, and an outflow port shutter **37** as an example of an open/closed member is supported in the shutter guides **36***b* and **36***c*. In FIGS. **11** and **13**, for the outflow port shutter **37**, a cartridge seal **37***a* as an example of a leakage prevention member is supported on the face opposed to the outflow port **36***a*.

In FIG. **8**, in exemplary embodiment 1, the thickness of the outflow port shutter **37** is formed as the thickness corresponding to the step difference between the shutter storage section **11** and the inflow face **13***c*.

In FIGS. **8** to **11** and **13** to **15**, a rib **38** extending in the back and forth direction projecting to the left, outward in the diametric direction as an example of a protrusion part and an example of an association block part is formed in the left part of the tubular wall **23**. The rib **38** is formed corresponding to the protrusion storage concave part **12** and is set so as to be stored in the protrusion storage concave part **12** in a state in which the toner cartridge TC is placed in the cartridge storage section **3**.

In FIGS. **5** to **7**, **9**, **11**, and **12**, a cartridge cover **39** for closing the front end of the tube part **22+23** as an example of a lid member is placed back in the insertion direction of the cartridge main body **21** or at the front end in the back and forth direction relative to the back and forth direction of attachment/detachment direction or the insertion direction of the toner cartridge TC. In FIGS. **11** and **12**, a cover seal **39***a* as an example of a leakage prevention member placed is placed between the cartage cover **39** and the front end of the tubular wall **23** of the cartridge main body **21**. The cartridge cover **39** is formed with a handle **39***b* extending in the left-right direction on the front as an example of an operation part. A semiconic handle concave part **39***c* dented backward relative to the insertion direction of the toner cartridge TC as an example of an operation concave part is formed on both up and down sides of the handle **39***b*. In FIG. **12**, the handle **39***b* is formed

with a bearing part **39***d* shaped like a circular hole dented forward from the back face relative to the insertion direction of the toner cartridge TC as an example of a shaft support part. In FIGS. **9** to **11**, a front rib **39***e* formed corresponding to the rib **38** and extending in the back and forth direction as an example of a registration part is formed on the outer peripheral surface of the cartridge cover **39**. Therefore, to assemble the cartridge cover **39** to the cartridge main body **21**, they are assembled so that the rib **38** and the front rib **39***e* match, whereby the position of the handle **39***b* can be placed at the preset position. The space surrounded by the cartridge main body **21** and the cartridge cover **39** forms the developer storage chamber **40** storing a developer.

In FIGS. **8** and **11** to **15**, an agitator **41** as an example of a developer conveying member is housed in the developer storage chamber **40**. The agitator **41** has a rotation shaft **42** extending in the back and forth direction relative to the insertion direction of the toner cartridge TC. A rear end **42***a* of the rotation shaft **42** is joined to the driven coupling **25** and a front end **42***b* is supported on the bearing part **39***d* for rotation. Therefore, when drive from the cartridge motor **17** is transmitted, the rotation shaft **42** is supported in a rotatable state.

The rotation shaft **42** has a center part **42***c* formed like a prism extending in the back and forth direction. A pair of back and forth mushroom-shaped film fixing projections **42***d* apart in the back and forth direction as an example of a fixing part for a conveying member is formed on one face side of the prism of the center part **42***c*. A rod-like agitation part **42***e* extending in the diametric direction from the center part **42***c* is formed on an opposite face on the opposed side to the film fixing projections **42***d*. When the rotation shaft **42** rotates, the agitation part **42***e* rotates integrally and agitates the developer in the developer storage chamber **40** and breaks down a massive developer.

In FIGS. **11** and **12**, a conveying film **43** formed of a thin-film flexible member as an example of a developer conveying member is supported on the film fixing projections **42***d* of the rotation shaft **42**. In FIG. **11**, for the conveying film **43**, an attachment hole **43***a* as an example of a fixed part formed in the center is supported in a state in which it pierces, and rotates integrally with the rotation shaft **42**. In FIG. **12**, a back cut part **43***b* shaped like a trapezoid cut corresponding to the transmission storage section **22***a* is formed in the back end part of the conveying film **43** relative to the insertion direction of the toner cartridge TC, and a front cut part **43***c* shaped like a trapezoid formed along the inner face of the handle concave part **39***c* is formed in the front end part relative to the insertion direction of the toner cartridge TC. Therefore, when the rotation shaft **42** rotates, the conveying film **43** comes in contact with the inner peripheral surface of the tubular wall **23** and conveys a developer toward the outflow port **36***a* in an elastically deformed state. In exemplary embodiment 1, the conveying film **43** is formed on both sides rather than only one side in the diametric direction of the rotation shaft **42**; at one revolution, a developer is twice conveyed to the outflow port **36***a* and the amount per unit time of the developer flowing out from the outflow port **36***a*, the dispense rate is easily stable.

(Operation of Exemplary Embodiment 1)

In the printer U of exemplary embodiment 1 including the configuration described above, when the toner cartridge TC is placed in the cartridge holder KH, it is moved in the placement (attachment) direction of the back direction from the distant position shown in FIG. **5** and is moved to the placement (attachment) position shown in FIG. **6**.

At this time, if the positions of the outflow port part **36** and the outflow port **25** shutter **37** and the position of the shutter storage section **11** match and the positions of the rib **38** and the front rib **39***e* and the position of the protrusion storage concave part **12** do not match, the toner cartridge TC is not placed. Particularly, the widths of the outflow port part **36** and the outflow port shutter **37** and the shutter storage section **11** in the left-right direction and the circumferential direction are formed corresponding to each other for preventing erroneous placement (attachment) at the positioning position shown in FIG. **15**.

When the toner cartridge TC is moved to the placement position, the positioning projections **6** and **7** are fitted into the positioning grooves **26** and **27**. Therefore, if the positions of the positioning projections **6** and **7** are fitted into the positioning grooves **26** and **27** or the number thereof differ in response to the model of the image forming apparatus, the color or the type of developer stored in the toner cartridge TC, etc. . . . , the positioning projections **6** and **7** are not fitted into the positioning grooves **26** and **27** and interfere with them and placing of an erroneous toner cartridge TC is prevented.

In FIGS. **6** and **14**, when the toner cartridge TC is placed in the cartridge holder KH, the drive coupling **4** and the driven coupling **25** mesh with each other and the outflow port part **36** and the outflow port shutter **37** are stored in the shutter storage section **11**. At this time, as shown in FIG. **14**, the positioning projections **6** and **7** are placed in the proximity of the upper end faces **26***b* and **27***b* of the positioning grooves **26** and **27**.

When the toner cartridge TC is rotated from the placement position and the unlock position shown in FIGS. **6** and **14** to the positioning position shown in FIGS. **7** and **15**, the positioning projections **6** and **7** and the positioning grooves **26** and **27** rotate relatively. When the toner cartridge TC moves to the positioning position as shown in FIG. **15**, the positioning projections **6** and **7** come in contact with the lower end faces **26***a* and **27***a* of the positioning grooves **26** and **27** and the move to the positioning position is complete. Therefore, the positioning projections **6** and **7** and the positioning grooves **26** and **27** engage, so that erroneous placement of toner cartridge can be prevented and the rotation position can be regulated.

In FIGS. **8** and **13**, when the toner cartridge TC moves from the unlock position to the positioning position, the outflow port part **36** rotates in an opposed state to the inflow face **13***c*; the outflow port shutter **37** comes in contact with the step difference between the shutter storage section **11** and the inflow face **13***c* and rotation is regulated. Therefore, the outflow port shutter **37** rotates relatively to the outflow port part **36**, and the outflow port shutter **37** moves relatively to the outflow port part **36** from the closed position at which the outflow port **36***a* is closed as shown in FIG. **13** to the opened position at which the outflow port **36***a* is opened shown in FIG. **8**.

At this time, the inflow port shutter **14** is pushed to the left end face of the moving outflow port part **36** and moves from the closing position closing the inflow port **13***d* shown in FIG. **5** to the opening position opening the inflow port **13***d* shown in FIG. **8**. At this time, the inflow port shutter **14** moves to the opening position in a state in which it is pinched by the outflow port part **36** and the rib **38** and the front rib **39***e*.

When the move of the toner cartridge TC to the positioning position is complete, the shutter **14** moves to the opening position and the outflow port shutter **37** moves to the opened position, the outflow port **36***a* and the inflow port **13***d* are connected, and the developer in the toner cartridge TC can be supplied to the developing device G.

At the positioning position, the outflow port part **36** is sandwiched back and forth between the shutter guides **13***a*

and **13***b* of the inflow port part **13** and the toner cartridge TC is held and positioned in a state in which it cannot move forward.

At the positioning position, when drive is transmitted from the cartridge motor **17** as an image is formed, the agitator **41** and the supplying auger V**4** rotate, the developer in the developer storage chamber **40** flows out from the outflow port part **36**, and the developer is supplied through the developer supplying passage V**3** to the developing device G.

In the toner cartridge TC of exemplary embodiment 1, the positioning grooves **26** and **27** are dented to the inside of the developer storage chamber **40** and if the flexible conveying film **43** rotates in a state in which it becomes elastically deformed in the portions corresponding to the lower end walls **26***a* and **27***a* of the positioning grooves, and arrives at the inner face corresponding to the upper end walls **26***b* and **27***b* and is elastically restored, there is a possibility that a space with which the conveying film **43** does not come in contact, a dead space may occur in the inner face corresponding to the upper end walls **26***b* and **27***b*. At the positioning position, if the upper end walls **26***b* and **27***b* are formed upward or horizontally as they are toward the rotation shaft **42**, it is feared that the developer stored in the inner face corresponding to the upper end walls **26***b* and **27***b* may be unused and may become fruitless. In contrast, in exemplary embodiment 1, the positioning grooves **26** and **27** are placed on a side relative to the center of the disk-like rear end wall **22** of the rotation center of the cartridge main body **21** at the undetachable position and the inner face corresponding to the upper end walls **26***b* and **27***b* is inclined downward as the inner face is toward the rotation shaft **42**; a developer easily drops naturally into the developer storage chamber **40** because of gravity, vibration at the passage time of the conveying film **43**, at the motor drive time, etc., and occurrence of unused developer is decreased. That is, accumulation of the developer in the inner portions of the positioning grooves **26** and **27** is decreased.

Likewise, in exemplary embodiment 1, the connector relief part **33** is formed in the upper end part and accumulation of the developer therein is decreased.

To remove the toner cartridge TC because the developer in the developer storage chamber **40** runs out, etc., first the toner cartridge TC is rotated from the positioning position shown in FIGS. **7**, **8**, **15**, etc., to the unlock position shown in FIGS. **6**, **14**, etc.

When the toner cartridge TC rotates from the positioning position to the unlock position, the positioning projections **6** and **7** and the positioning grooves **26** and **27** rotate relatively. When the toner cartridge TC moves to the unlock position, the positioning projections **6** and **7** are close to and come in contact with the upper end faces **26***b* and **27***b* of the positioning grooves **26** and **27** and the move to the unlock position is complete, as shown in FIG. **14**.

In FIGS. **8** and **13**, when the toner cartridge TC moves from the positioning position to the unlock position, the outflow port shutter **37** is held in a state in which it cannot move in the rotation direction in the shutter storage section **11**. In other word, the outflow port shutter **37** moves relatively to the outflow port part **36**, and the outflow port shutter **37** moves relatively to the outflow port part **36** from the opened position to the closed position. At this time, the inflow port shutter **14** is pushed by the rib **38**, etc., of the rotating toner cartridge TC and moves from the opening position to the closing position. Therefore, when the toner cartridge TC moves from the positioning position to the unlock position, the shutters **14** moves to the closing position, the outflow port shutter **37** moves to the closed position and the inflow port **13***d* and the outflow port **36***a* are closed.

In a state in which the toner cartridge TC moves to the unlock position, the rotating outflow port part **36** is away from the shutter guides **13***a* and **13***b* and positioning is released. Therefore, the toner cartridge TC can be moved in the detachment direction (forward) and can be removed and replaced.

FIG. **16** is a schematic representation of a change example of exemplary embodiment 1 and is a drawing corresponding to FIG. **10** of exemplary embodiment 1.

In FIG. **16**, in the change example of exemplary embodiment 1, in a toner cartridge TC' corresponding to a printer of a different model from the printer U, as for the positioning grooves **26** and **27** of the toner cartridge TC of exemplary embodiment 1, positioning grooves **26'** and **27'** are formed at shift positions in the diametric direction of the disk-like rear end wall **22**. As the positions of the positioning grooves **26'** and **27'** change, the positioning projections **6** and **7** are also formed at positions corresponding to the positioning grooves **26'** and **27'**.

In the toner cartridges TC and TC' of exemplary embodiment 1 and the change example of exemplary embodiment 1, for example, the toner cartridges TC and TC' may be shipped to different destinations of Europe, North America, Asia, etc., as well as Japan and a plurality of models in OEM (Original Equipment Manufacturing) may be shipped. That is, the specifications of the corresponding printer U may differ and a developer different in composition, manufacturing process, melting point, fluidity, etc., may be stored in the toner cartridge TC, TC' in response to the printer U. Therefore, the toner cartridge TC corresponding to one model may be incompatible with a different model of printer U. Therefore, the positioning grooves **26** and **27**, **26'** and **27'** can be formed at different positions for each different type of toner cartridge TC, TC' and the type of toner cartridge TC, TC' can be identified. If the user attempts to place the toner cartridge TC' in an incompatible printer U, the positioning projections **6** and **7** are not fitted into the positioning grooves **26'** and **27'** and interfere with them and the toner cartridge TC, TC' is not inserted to the placement position and erroneous placement of a different toner cartridge can be prevented.

Exemplary Embodiment 2

FIG. **17** is a schematic representation of a developer storage container of exemplary embodiment 2 and is a drawing corresponding to FIG. **10** of exemplary embodiment 1.

Exemplary embodiment 2 of the invention will be discussed. Components corresponding to those of exemplary embodiment 1 are denoted by the same reference numerals and will not be discussed again in detail.

Exemplary embodiment 2 differs from exemplary embodiment 1 only in the following:

In FIG. **17**, in a toner cartridge TC" of exemplary embodiment 2, a sector-shaped common groove **51** corresponding to the connection shape of positioning grooves **26** and **27** as an example of a turn stop part is formed in place of the positioning grooves **26** and **27** of exemplary embodiment 1. A partition block **52** shaped like a circular arc formed as a different shape in response to the type of toner cartridge TC, the model of image forming apparatus, etc., as an example of a partition member can be placed in the common groove **51**. Therefore, the partition block **52** corresponding to positioning projections **6** and **7** is placed, so that the positioning grooves **26** and **27** can be formed.

(Operation of Exemplary Embodiment 2)

In the toner cartridge TC of exemplary embodiment 2 including the configuration described above, the placed partition block **52** is replaced, whereby the toner cartridge

becomes compatible with any model of image forming apparatus and any type of toner cartridge TC and a cartridge main body **21** is made common. Therefore, the manufacturing cost can be reduced as compared with the case where the toner cartridge TC is manufactured separately for each model and for each type.

Change Examples

While the exemplary embodiments of the invention have been described in detail, it is to be understood that the invention is not limited to the specific exemplary embodiments described above and various changes and modifications can be made without departing from the spirit and the scope of the invention as described in Claims. Change examples (H01) to (H010) of the invention are illustrated below:

(H01) In the exemplary embodiments described above, a printer is illustrated as an example of the image forming apparatus, but the image forming apparatus is not limited to the printer and, for example, can also be a copier, a facsimile machine, a multiple function device including some or all of the functions, or the like.

(H02) In the exemplary embodiments described above, as the printer U, the configuration wherein a single-color developer is used is illustrated, but the printer is not limited to it. For example, it can also be applied to an image forming apparatus of multiple colors of two or more colors. At this time, the diameter or the circular arc length of the positioning groove **26**, **27** can be changed in response to the difference in the color of the developer stored in the toner cartridge TC, the type of toner such as the composition, melting point, fluidity of the developer, the destination of the toner cartridge, etc. The toner cartridge TC can be identified and can be prevented from being erroneously placed in an incompatible printer model or the cartridge storage section **3** not corresponding to the color of the toner cartridge.

(H03) In the exemplary embodiments described above, the rib **38** and the front rib **39***e* are provided, but they may be omitted. At this time, the inflow port shutter **14** can also be moved to the closing position using a spring as an example of an elastic member.

(H04) In the exemplary embodiments described above, the length, the width, etc., of the toner cartridge TC can be changed in response to the design, the specification, etc.

(H05) In the exemplary embodiments described above, the configuration of the agitator **41** is not limited to the configuration illustrated in the exemplary embodiments, and any already known configuration can be adopted.

(H06) In the exemplary embodiments described above, the upper end walls **26***b* and **27***b* are formed so as to be inclined downward as they are toward the rotation center, but they may also be formed so as to be inclined horizontally or upward.

(H07) In the exemplary embodiments described above, the number and the positions of the positioning projections **6** and **7** and the number and the positions of the positioning grooves **26** and **27** can be changed in response to the design, the specification, etc.

(H08) In the exemplary embodiments described above, as the CRUM **32** and the CRUM reader **9**, the contact configuration wherein the connectors **9***a* and **32***a* are brought into contact with each other is illustrated, but the configuration is not limited to it and CRUM and CRUM reader of already known wireless communication type can also be adopted. The installing positions of the CRUM **32** and the CRUM reader **9** are not limited to the positions illustrated in the exemplary embodiment and can be changed in response to the design, etc.

(H09) In the exemplary embodiments described above, at the shipment time, the printer U, the toner cartridges TC, TC', and TC" can be packaged separately or they can be packaged in a state in which any of the toner cartridge TC, TC', or TC" is preinstalled in the printer U, and the number of package containers can also be decreased. If they are preinstalled, in a state in which the toner cartridge TC, TC', TC" moves to a detachable position, there is a possibility that the toner cartridge TC, TC', TC" may drop due to swing, etc., at the conveying time. Thus, to prevent the toner cartridge TC, TC', TC" from dropping off, the toner cartridge TC, TC', TC" may be a little rotated from a detachable position so that the toner cartridge TC, TC', TC" is caught in the cartridge storage section **3** to prevent dropping off. At this time, the toner cartridge TC, TC', TC" may be caught at a position shifting from the detachable position while the shutter **14** closing the inflow port **13***d* for preventing the developer from leaking, and while the shutter **37** closing the outflow port **36***a* for preventing the developer from leaking. As the direction in which the toner cartridge is a little rotated from the detachable position, the side of the undetachable position can also be adopted or the toner cartridge can also be rotated on the opposite side to the undetachable position not usually used.

As a method of catching the toner cartridge in the cartridge storage section **3**, a projection can be provided or heat welding, press contact, or an adhesive can be used. The toner cartridge can be caught or can be brought into intimate contact or can be adhered only initially at preinstallation and when the worker rotates the toner cartridge from the preinstallation position, it peels off or is broken and can be placed so as not to be later caught. A part of the cartridge storage section **3** or the toner cartridge TC, TC', TC" can be elastically deformed and can be held at the preinstallation position by an elastic restoration force. That is, the toner cartridge TC, TC', TC" can also be moved among the detachable position, the undetachable position, and the initial hold position in a preinstallation state.

(H10) In the exemplary embodiments described above, the circular arc length and the position of the positioning groove **26**, **27**, **26'**, **27'** shaped like a circular arc can be changed in response to the design, the specification, etc. To identify the toner cartridge TC, TC', TC" and prevent erroneous placement of the toner cartridge TC, TC', TC", the circular arc length, the position in the diametric position, the width of the groove in the diametric position, the depth of the groove, the number of grooves, etc., can also be changed.

The foregoing description of the exemplary embodiments of the present invention has been provided for the purposes of illustration and description. It is not intended to be exhaustive or to limit the invention to the precise forms disclosed. Obviously, many modifications and variations will be apparent to practitioners skilled in the art. The embodiments were chosen and described in order to best explain the principles of the invention and its practical applications, thereby enabling others skilled in the art to understand the invention for various embodiments and with the various modifications as are suited to the particular use contemplated. It is intended that the scope of the invention be defined by the following claims and their equivalents.

What is claimed is:

1. A developer storage container comprising:

a container main body in which a developer is stored, the container main body that is configured to be attached to and detached from an attachment section provided in an image forming apparatus main body and, the container main body that is configured to at least rotate in a state that the container main body is inserted into the attach-

ment section, to a detachable position at which the container main body can be detached from the attachment section and an undetachable position at which the container main body cannot be detached from the attachment section; an outflow port that is formed in the container main body and from which the developer flows out;

an open/closed member that moves relatively to the outflow port based on a rotation of the container main body, the open/closed member that is supported so as to move to an opened position at which the outflow port is opened and a closed position at which the outflow port is closed, the open/closed member that moves to the closed position when the container main body moves to the detachable position, the open/closed member that moves to the opened position when the container main body moves to the undetachable position; and

a turn stop part that is formed on a wall face of the container main body, the wall face being provided on a downstream side in a insertion direction in which the container main body is inserted into the attachment section, the turn stop part that is dented to an upstream side in the insertion direction and has a circular arc shape being concentric with a rotation direction of the container main body.

2. A developer storage container comprising:

a container main body in which a developer is stored, the container main body that is configured to be attached to and detached from an attachment section provided in an image forming apparatus main body and, the container main body that is configured to at least rotate in a state that the container main body is inserted into the attachment section, to a detachable position at which the container main body can be detached from the attachment section and an undetachable position at which the container main body cannot be detached from the attachment section; an outflow port that is formed in the container main body and from which the developer flows out;

an open/closed member that moves relatively to the outflow port based on a rotation of the container main body, the open/closed member that is supported so as to move to an opened position at which the outflow port is opened and a closed position at which the outflow port is closed, the open/closed member that moves to the closed position when the container main body moves to the detachable position, the open/closed member that moves to the opened position when the container main body moves to the undetachable position; and

a turn stop part that is formed on a wall face of the container main body, the wall face being provided on a downstream side in a insertion direction in which the container main body is inserted into the attachment section, the turn stop part that is dented to an upstream side in the insertion direction and has a circular arc shape being concentric with a rotation direction of the container main body.

3. The developer storage container according to claim **1**, wherein, when the container main body moves to the undetachable position and the open/closed member moves to the opened position, the turn stop part is positioned on a side relative to a rotation center of the container main body.

4. The developer storage container according to claim **1**, wherein the turn stop part has an upper end face and a lower end face of the circular arc shape being concentric with the rotation direction of the container main body, and when the container main body moves to the undetachable position and the open/closed member moves to the opened position, the turn stop part is positioned on a side relative to a rotation center of the container main body and the upper end face is inclined downward in a gravity direction as it is toward the rotation center of the container main body.

5. The developer storage container according to claim **1**, further comprising: an information storage member that comes in contact with a contact terminal provided in the image forming apparatus main body, wherein at least information is read from the information storage member, and when the container main body is rotated from the detachable position toward the undetachable position, the information storage member comes in contact with the contact terminal before the turn stop part comes in contact with the convex part.

6. The developer storage container according to claim **1**, wherein the turn stop part is formed at a concentrically different position in response to the type of the developer storage container.

7. The developer storage container according to claim **1**, wherein the container main body comprises: a cylindrical tubular part that has a tubular tube wall and a bottom wall supported on one end side of the tubular tube wall and a lid member that closes the other end side of the tubular tube wall of the cylindrical tubular part, and wherein the open/closed member and the information storage member are provided on the tubular tube wall and the turn stop part is provided on the bottom wall of the cylindrical tubular part.

8. The developer storage container according to claim **7**, wherein when the container main body moves to the undetachable position, the outflow port is formed so as to be inclined downward in a gravity direction relative to a diametric direction of the tubular tube wall.

9. An image forming apparatus comprising: an image holding body; a developing device that develops a latent image formed on a surface of the image holding body to a visible image; and a developer storage container according to claim **1**, that stores a developer to be supplied to the developing device.

10. The developer storage container according to claim **2**, wherein, when the container main body moves to the undetachable position and the open/closed member moves to the opened position, the turn stop part is positioned on a side relative to a rotation center of the container main body.

11. The developer storage container according to claim **2**, wherein the turn stop part has an upper end face and a lower end face of the circular arc shape being concentric with the rotation direction of the container main body, and when the container main body moves to the undetachable position and the open/closed member moves to the opened position, the turn stop part is positioned on a side relative to a rotation center of the container main body and the upper end face is inclined downward in a gravity direction as it is toward the rotation center of the container main body.

12. The developer storage container according to claim **2**, further comprising: an information storage member that comes in contact with a contact terminal provided in the image forming apparatus main body, wherein at least information is read from the information storage member, and when the container main body is rotated from the detachable position toward the undetachable position, the information storage member comes in contact with the contact terminal before the turn stop part comes in contact with the convex part.

13. The developer storage container according to claim 2, wherein the turn stop part is formed at a concentrically different position in response to the type of the developer storage container.

14. The developer storage container according to claim 2, wherein the container main body comprises: a cylindrical tubular part that has a tubular tube wall and a bottom wall supported on one end side of the tubular tube wall and a lid member that closes the other end side of the tubular tube wall of the cylindrical tubular part, and wherein the open/closed member and the information storage member are provided on the tubular tube wall and the turn stop part is provided on the bottom wall of the cylindrical tubular part.

15. The developer storage container according to claim 14, wherein when the container main body moves to the undetachable position, the outflow port is formed so as to be inclined downward in a gravity direction relative to a diametric direction of the tubular tube wall.

16. An image forming apparatus comprising: an image holding body; a developing device that develops a latent image formed on a surface of the image holding body to a visible image; and a developer storage container according to claim 2, that stores a developer to be supplied to the developing device.

17. The image forming apparatus according to claim 9, wherein the turn stop part is configured to engage with a convex part in the image forming apparatus which (i) projects to the upstream side in the insertion direction and (ii) is provided in the attachment section, the turn stop part that has at least a central angle corresponding to a rotation angle at which the container main body rotates to the detachable position and the undetachable position, and the turn stop part that comes in contact with the convex part when the open/closed member moves to the opened position.

18. The developer storage container according to claim 1, wherein the turn stop part is configured to engage with a convex part in the image forming apparatus which (i) projects to the upstream side in the insertion direction and (ii) is provided in the attachment section, the turn stop part that has at least a central angle corresponding to a rotation angle at which the container main body rotates to the detachable position and the undetachable position, and the turn stop part that comes in contact with the convex part when the open/closed member moves to the opened position.

19. The image forming apparatus according to claim 16, the turn stop part is configured to engage with a convex part which (i) projects to the upstream side in the insertion direction, and (ii) is provided in the attachment section.

20. The developer storage container according to claim 2, wherein the turn stop part is configured to engage with a convex part which (i) projects to the upstream side in the insertion direction, and (ii) is provided in the attachment section.

* * * * *